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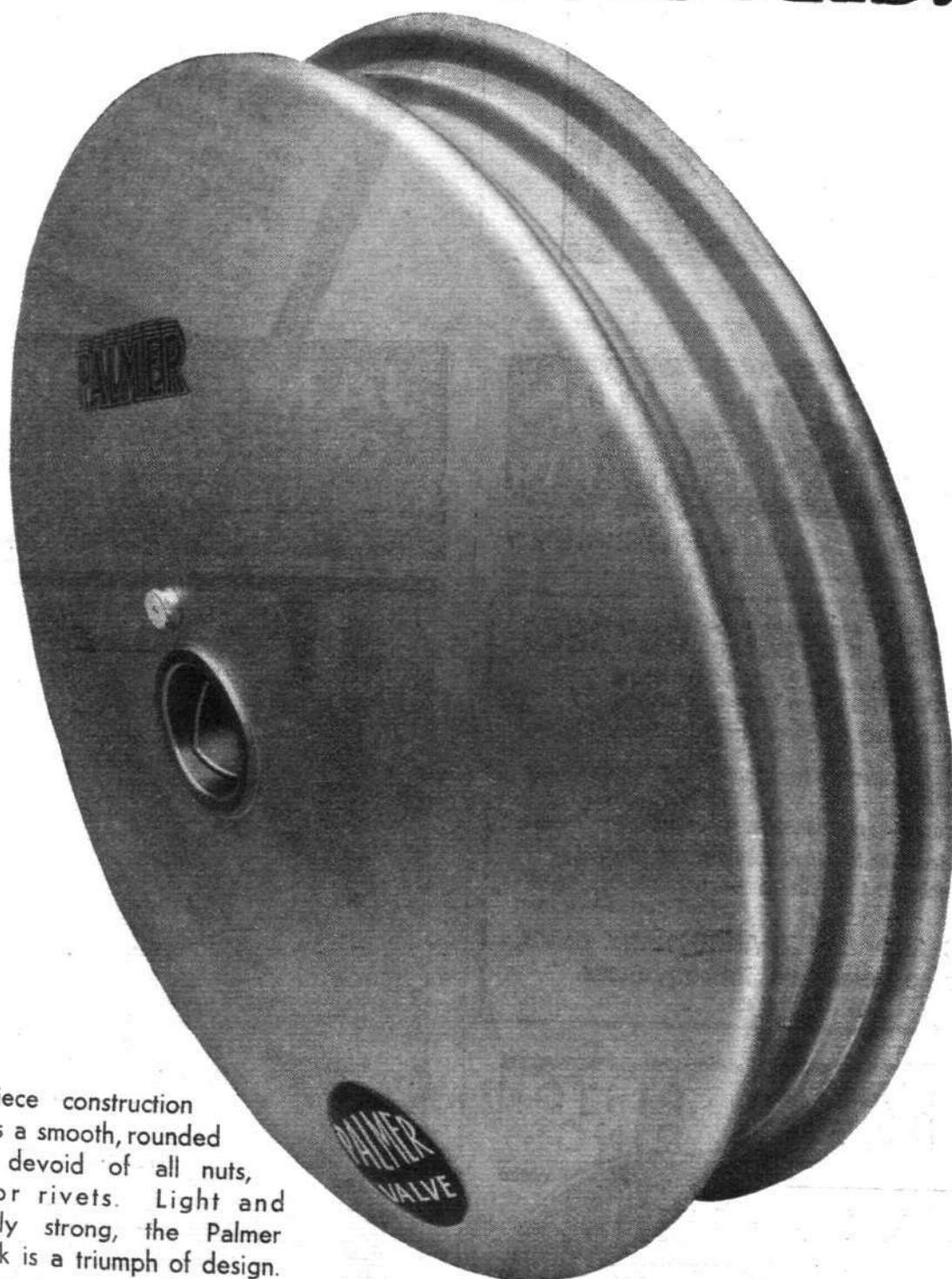
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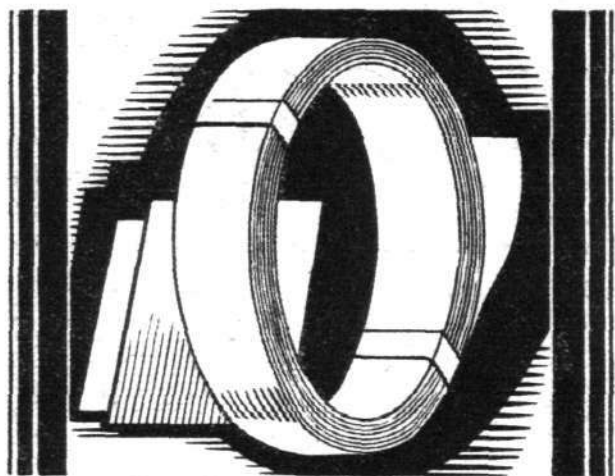
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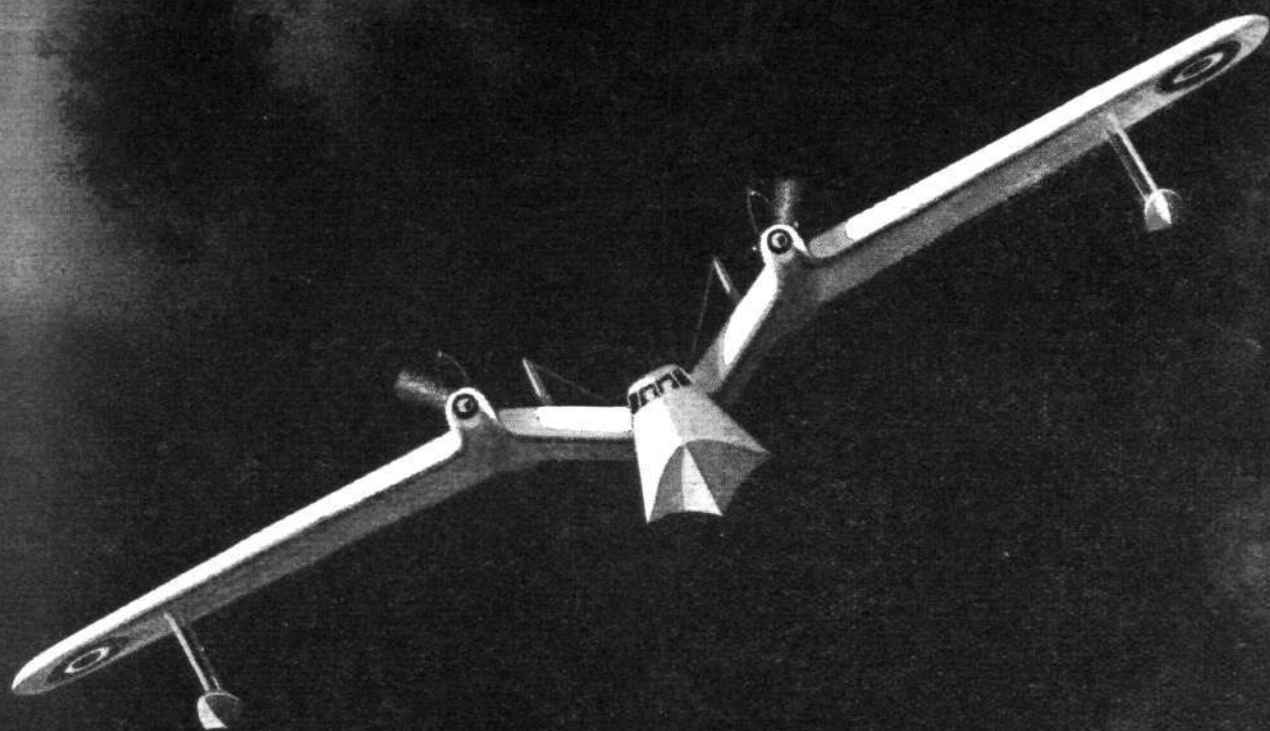
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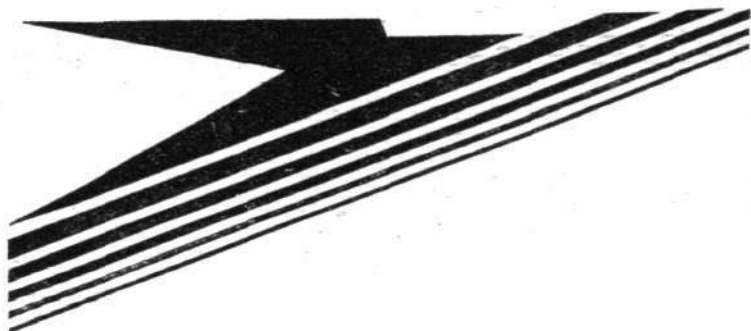
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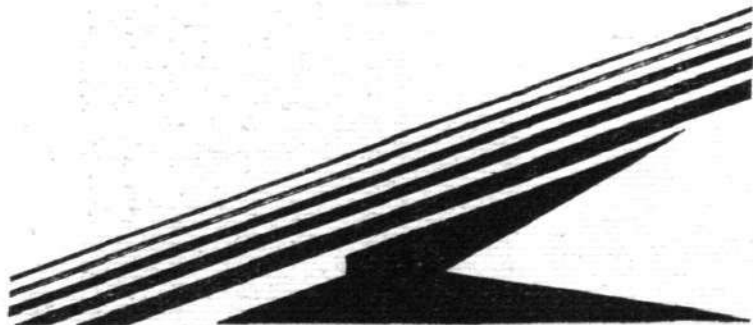
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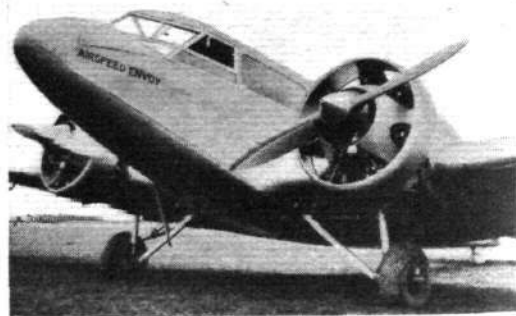
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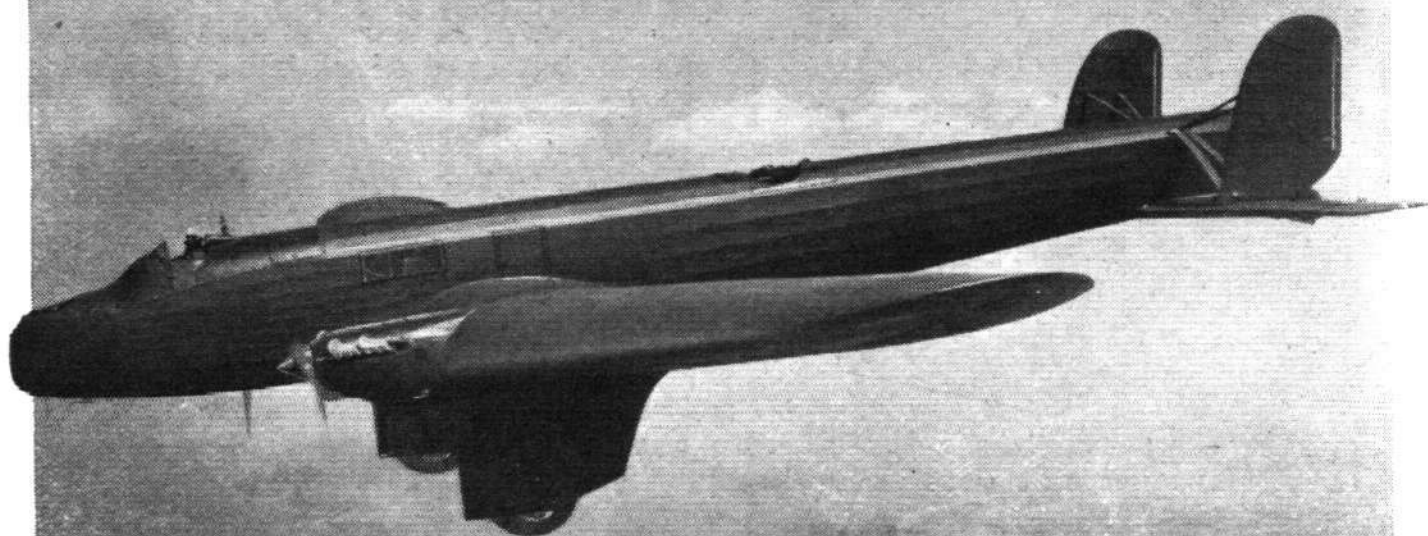


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## The Peace Pact

THE first signs of the reception of the peace pact proposed by Britain and France are favourable. France, on the whole, is enthusiastic. Germany seems inclined to think that recognition of her right to re-arm will make her adhesion to the pact worth while. Italy has indicated approval in principle, while remarking that she is too far away from Britain for a pact of mutual assistance to be really practicable. On that point Sir John Simon gave a hint that the best plan might be to have two similar pacts, one dealing with the South and one for the North, in order to limit the liabilities of Britain and Italy towards each other. Such an arrangement would not interfere with the principle of the pact, but would be only a matter of major detail. None the less, we may remark that in the event of an unprovoked attack the other partners will be required not to fly into the country attacked but to punish the aggressor. The only sort of case in which difficulties might arise would be if, say, Britain made an unprovoked attack on Belgium. Then Italy could hardly be expected to bomb Woolwich Arsenal or Uxbridge. But if France were to attack Belgium, then the Italian bombers could pay attention to the seaplane station at Etang de Berre.

One rather cynical criticism of the pact has been made by a certain "General X," writing in *L'Aéro*. He takes the line that the reprisals upon an aggressor can only be undertaken by long-range bombers, which is, generally speaking, correct. The majority of Britain's Air Force, he says, is organised for home defence, and not for offence. It is true enough that we have in this country only five squadrons of heavy bombers, and, if we exclude the Auxiliary Air Force, the numbers of our light bombers and fighters are about equal. Still, our Air Force is in process of expansion, and the value of our pledged word is not to be measured by the composition of that Force in February, 1935. The unknown General goes on to state that 70 per cent. of the French Air Force

is devoted to army co-operation, and would be useless for long-range bombing operations. Italy has the Alps for a frontier, while Russia—but Russia is not suggested as one of the signatories, so that the General need not have mentioned her. Belgium he does not mention at all, despite her excellent "Foxes" and "Fireflies," presumably because she, too, is not equipped for offensive bombing. The General then goes on to say that the aggressor, being "master of the hour," will have the advantage of surprise, and he asks if it is possible to make the signatories to the pact keep their Air Forces in constant readiness. For our part, we believe that Britain would find no difficulty in that. Whatever may be the number of our squadrons of heavy bombers two years hence, we feel convinced that it would take but a very short time to get them all into the air, loaded with bombs, on receipt of the news that one of our Allies (for Allies the other signatories would be) had been attacked.

### Military Objectives

The General then questions whether the peace pact would be effective if towns were not attacked, but only military objectives. We cannot conceive any aggressor being so besotted as to neglect military objectives in his first surprise onslaught. If the first raid put all the French long-range bombers out of action, and Britain had no more than five squadrons of heavy bombers, the aggressor would have done something to minimise the chances of reprisals. The pact, when it is drawn up for signature, must certainly cover the case of attacks on military objectives.

This article is obviously a plea that France must rely upon her own air strength rather than upon alliances. Admittedly, the question as to what is an unprovoked attack is always liable to delay action by signatories to a pact of this description, but it is easy to make too much of that point. Foreign Offices watch the trend of international events, and attacks without a previous disagreement are not likely to occur. Before the first blow has been struck interested nations usually know

which side they consider to be in the wrong. Taking that into consideration, the proposed pact certainly holds out a prospect to the signatories of refraining from ruinous expenditure on bloated air armaments.

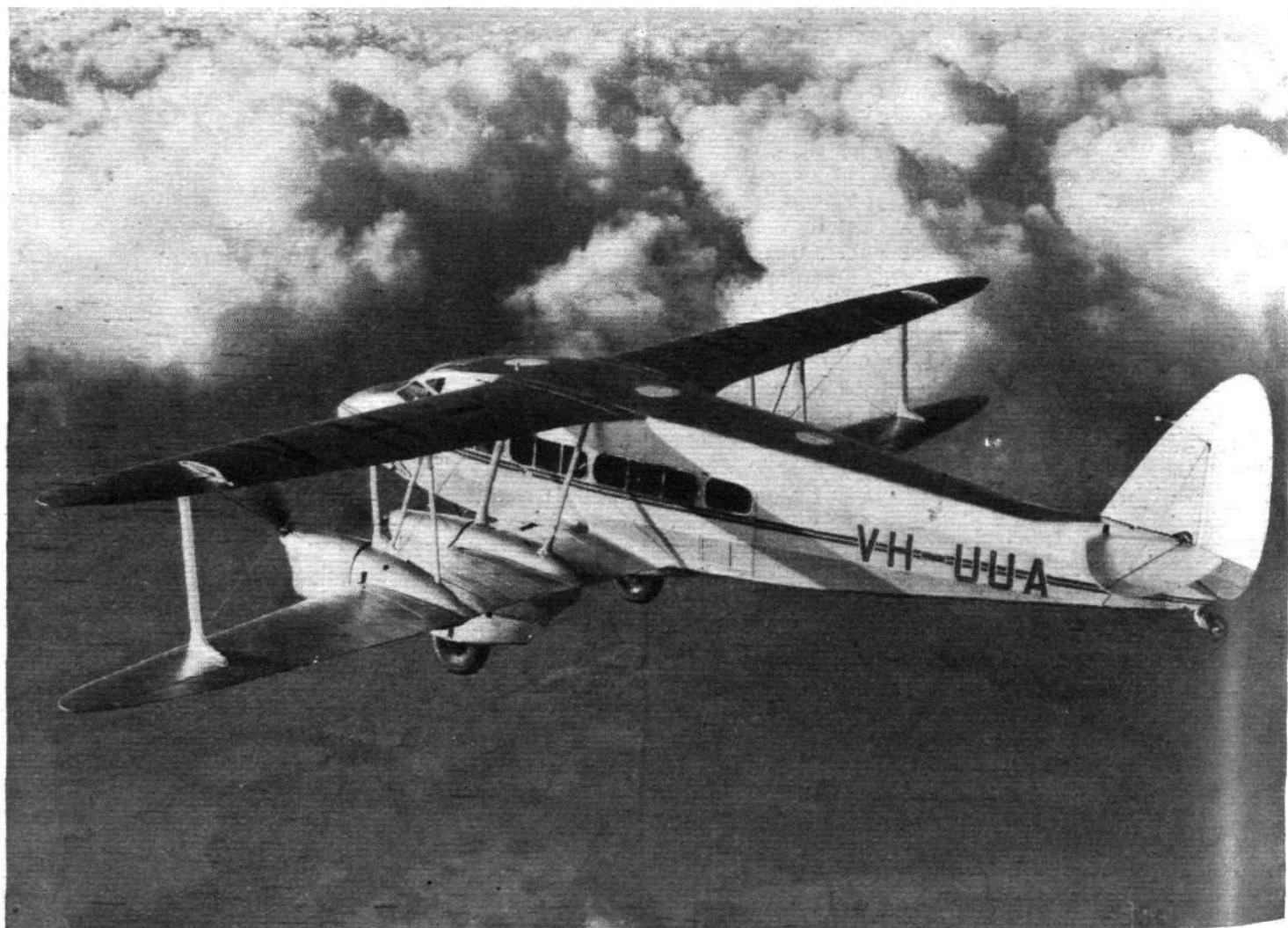
## Mails and Passengers in India

**D**URING the last few years *Flight* has followed with much interest the gradual development of civil flying in India, and has commented on each forward step. While feeling that our duty has been done to our readers, we also feel that we must congratulate Mr. J. A. Shillidy, C.S.I., on the excellence of the paper which he read on Friday last before the Indian Section of the Royal Society of Arts. It gave, concisely but fully, the whole history of this subject, and made clear what good work has been done by the two Directors of Civil Aviation, Lieut-Col. Shelmerdine and Capt. Tymms, M.C., in circumstances of great difficulty.

One point in the paper calls for further comment. No figures could be given of the number of passengers carried by air inside India by Imperial Airways and Indian Trans-Continental Airways (who work in collaboration), or by Indian National Airways. The Tata air line is not concerned with passengers, although it occasionally accepts them. Mr. Shillidy pointed out that a weekly service does not offer sufficient inducement to travel by air when there are several railway services daily. More

frequent services would attract more passengers, but India is a poor country, and air transport is the most expensive form of travel. The bulk of railway passengers are third class, and not on a penny-a-mile basis. If flying is to play its part in the life of India it must, he said, rest on a third-class basis.

This is true, and it makes one wonder if aeroplanes will ever be able to meet the demand for third-class travel. Government officials are reasonably well paid, but they are a mere handful, and the same may be said of the rich landowners, commonly entitled Rajas, of British India. Both these classes will certainly not be slow to take every opportunity that is offered of travelling by air. Before long it may easily become a settled policy of the Governments, central and provincial, to provide their district officials with suitable light aeroplanes for touring their districts. Such a step should greatly facilitate administration, for districts are large and personal visits by the officials are the most important means of ruling the country. The more frequent the visits to each village the better the country is administered. A prompt visit by a magistrate will often settle a dispute which might otherwise have grown into a riot. Whether the impecunious villagers, or even the traders and artisans of the towns, will ever be able to travel by the air lines is another matter. If the fares cannot be brought down to the level of their capacity to pay it looks as if mails will be the only cargo which aircraft operators need consider.



**A MAJESTIC CLOUDSCAPE.** Taken by a *Flight* photographer among snow-clouds near Hatfield last week, this impressive picture shows the sixth and last D.H.86 of the fleet ordered by Qantas Empire Airways for the Singapore-Brisbane section of the Empire route.



# The Outlook

## A Running Commentary on Air Topics

### Cruising Speed Range

THE importance of a high operating speed, and particularly of a wide speed range, is becoming more and more marked as the airline network closes up. Over several European routes the question of whether a particular journey can be made in a single day depends entirely on the making of connections, and a strong head wind over the first section will upset the entire time-table.

A wide range of cruising speeds will eventually be an essential characteristic of all commercial machines, and, of course, the higher the cruising speed the less will be the relative effect of a strong head wind.

### Cause and Effect

A FEW simple calculations on the basis of varying distances, cruising speeds, and winds will still bring some surprising, if obvious, facts to light. Not so long ago a member of the staff of *Flight* travelled some six hundred miles by air against a wind which varied in strength between 40 and 60 m.p.h. The cruising speed of the machine was 150 m.p.h., and the flight took just two hours longer than the scheduled time. If the air speed could have been pushed up to, say, 170 m.p.h., only an hour would have been lost, and some of this might have been saved by making shorter refuelling stops.

On the other hand, a machine cruising at a bare 100 m.p.h. would, for the same distance, have taken *twelve hours*—more than twice as long as the scheduled time for that particular machine. No connection could be expected to wait for those six hours! Besides, darkness has a little habit of falling.

### Be Fair!

BEFORE long there will be at least a hundred Autogiros of the C.30 type flying. Others are known to be coming along, such as the large and small types being built by the Westland Aircraft Works and the very small Autogiro in which Air Comdre. J. G. Weir has been interested for a considerable time.

In other words, the Autogiro has "arrived." Its more extensive use, and the fact that instead of being flown by experts it will be handled by all manner of pilots, good, bad and indifferent, must inevitably result in a certain number of mishaps. How great that number is, and how serious the mishaps, will largely depend upon the frame of mind in which the users approach their new mount.

At the present time there is a tendency, which is to be deplored, to treat the Autogiro as one would an orthodox aeroplane. We are aware that Autogiros have been looped occasionally, and there is at least one case on record of one having been half-rolled. Now, it may be very amusing for a pilot to be able to boast that he has done these stunts on an Autogiro, but it is not part of the functions of an aircraft of this type to be so treated. It is all to the good that experiments should be made to find out how an Autogiro behaves when made to do these things; but finding out is the test pilot's job, and certainly not that of the ordinary user.

In the Autogiro we have a type of aircraft which will do things no aeroplane could do. Let us, in all fairness,

confine ourselves to making the best possible use of these qualities, and not try to make the machine do things for which it is ill-suited. If that policy is followed, the future mishaps will be few and probably not of a very serious nature. If it is disregarded, serious accidents will occur, and the machine will earn a bad name which it does not deserve.

### Sea and Air Power

LAST week Mr. Hector Bywater, the naval correspondent of *The Daily Telegraph*, had two very interesting and eminently sensible articles in that paper on "Sea Power or Air Power," in which he combated the views of what may be called the extreme air school, namely, that sea power is no longer necessary to Britain provided that she is possessed of very great air power.

It is rather humiliating that it should be necessary for anyone to plead in such a cause in the year of grace 1935, for it is perfectly manifest to any ordinary sane person that Britain must have both sea power and air power. Mr. Bywater is no opponent of air power—quite the reverse, and he is constantly pleading that the Fleet Air Arm should be made strong enough, and kept strong enough, to perform its essential functions for the Fleet.

The case which he makes for maintaining sea power in order to guard our trade routes is not only incontrovertible, but is so plain and clear that it seems extraordinary, and even pitiable, that it should have had to be written. Unfortunately, there are still some air extremists who cannot see the necessity for any form of defence except what is afforded by aircraft, and their views, when expressed, need to be controverted. The majority of air people are, none the less, quite sane and sensible folk, and are not unbalanced by the accomplished wonders, and still more wonderful possibilities, of flying. All such, including *Flight*, are assuredly in sympathy with the sensible views of Mr. Bywater.

### An Unsolved Mystery

THE cause of the disaster which overtook the Batavia-bound Douglas just before Christmas still remains as much of a mystery as ever. After the initial report by K.L.M., in which the accident was definitely attributed to the effect of lightning, Dr. Van der Maas has made a report on behalf of the Netherlands Government, and a Dutch newspaper states that the lightning hypothesis has now been discarded.

It was reported that there was no structural defect; the machine was trimmed for level flight with the throttles in cruising position; nor was there any suggestion in the last wireless messages that the *Uiver* was in difficulties; and now lightning has been ruled out.

Dr. Van der Maas's report is not to be published, and perhaps this secrecy had something to do with a sinister rumour which was current in London on Monday. The pilot, it was suggested, had been shot by an hysterical passenger! Rumour always follows quickly on the suppression of a report of any kind, and the Dutch Government would, perhaps, be well advised to publish before such rumours become facts in the minds of the general public.

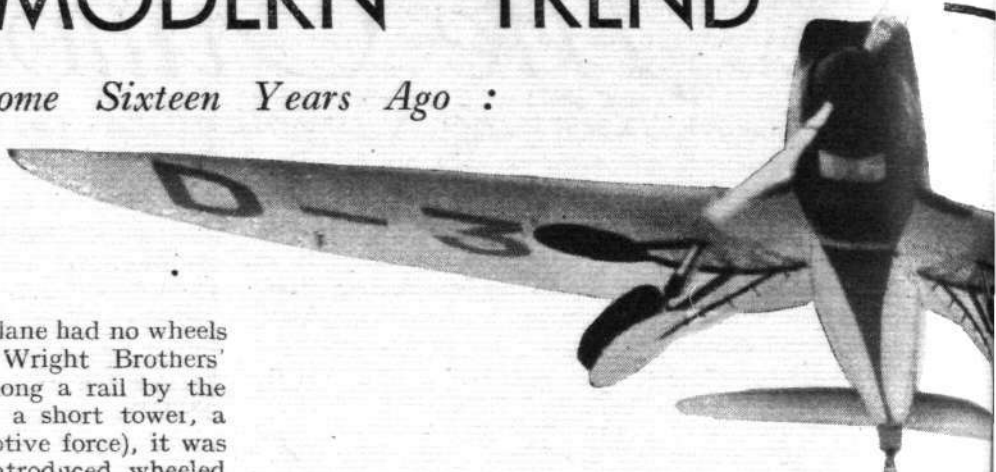
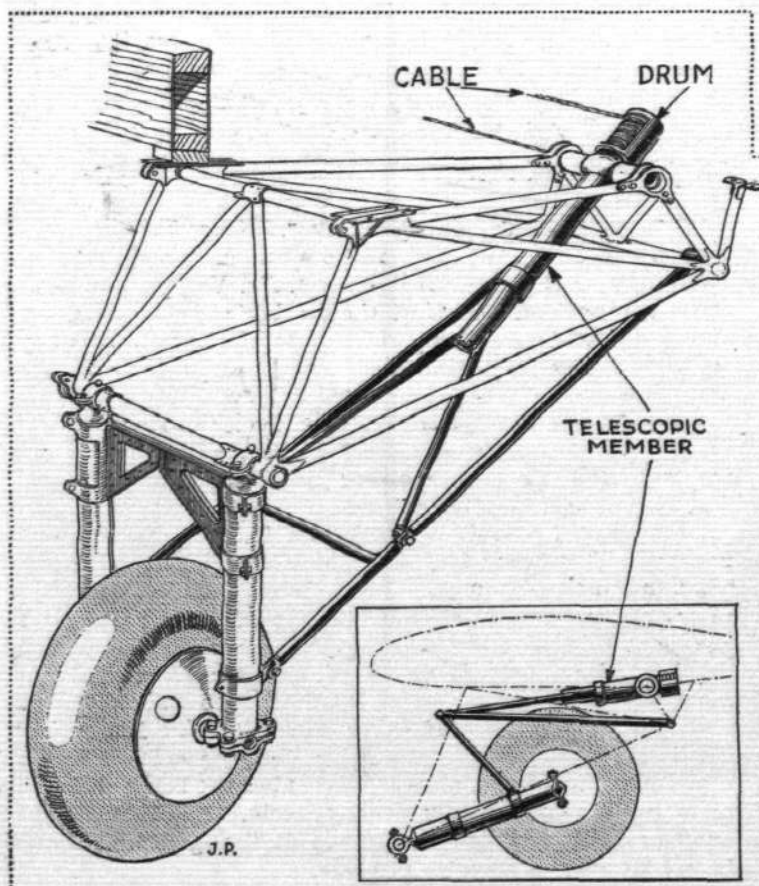
We have, in *Flight*, always advocated the early and complete publication of accident reports, and this is just another case in which the minds of flying people should be set at rest as soon as possible.

# THE MODERN TREND

*How They Originated Some Sixteen Years Ago :  
Representative Types  
Reviewed : The Vogue  
Spreads to Biplanes*

**A**LTHOUGH the first practical aeroplane had no wheels (we refer, of course, to the Wright Brothers' machine, which was launched along a rail by the pull of a cable over a pulley in a short tower, a dropping weight providing the extra motive force), it was not long before the early designers introduced wheeled undercarriages, and wheels have remained with us ever since, a necessary evil which many have come to accept as inevitable. Until a comparatively few years ago, when speeds were of the order of 100 m.p.h. or under, the drag of an undercarriage was of relatively small importance. As speeds increased and experience brought to light the vicious circle of trying to get more speed merely by "piling on power," the reduction of drag passed from being a desideratum to becoming a necessity.

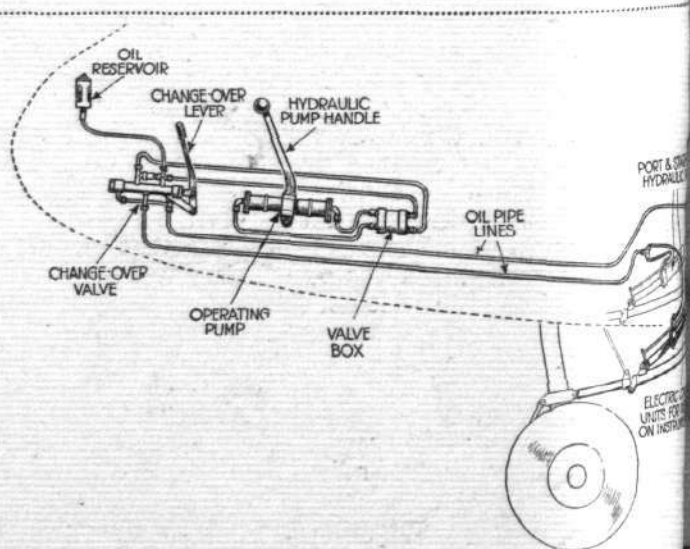
The undercarriage obviously presented one very fruitful field for improvement, and gradually the retractile undercarriage came into being. It has now become firmly established, and a number of systems have been tried out, differing in detail but mostly falling into two general classes: those in which the wheels are swung upward in a longitudinal plane and those in which the movement is in lateral direction. With the former it is usual to find that a portion of the wheel projects beyond the surface of the structural member used for housing it. When lateral operation is employed, it is rather easier to "bury" the wheel completely, and in several instances wooden or metal discs and strips are employed for closing completely any small opening left between the wheel and struts and the surrounding surface.



It is a matter of some difficulty to decide who was the first to employ a retractile undercarriage. Mr. James V. Martin, an American who was well known at Hendon in the early days of flying, certainly invented a retractile system and used it just after the war. In the Gordon Bennett Race held at Etampes, France, in 1920, a small monoplane built by the Dayton-Wright company of America was entered and made some flights, although a broken rudder cable prevented it from competing in the race. That machine not only retracted its wheels into the fuselage, but also had variable-camber wings, so that neither idea is quite new!

## Various Types Equipped

Obviously the aircraft most suited for the installation is the low-wing monoplane, in which the size and movements of the working parts of the undercarriage are small, and which allows the wheels to be folded into the wing or engine nacelles. But high-wing monoplanes and biplanes have also been equipped. The Dornier Do.F and Fokker F.XX are examples of the former type, and the latter machines, in which the wheels, when retracted, are usually housed in the fuselage, are to be seen almost exclusively in the U.S.A. Considering monoplanes, it is apparent that the wheels may fold in a lateral or longitudinal plane, or with a "twisting" motion, although this last type is not yet in general use. Let us first consider the most usual form of undercarriage—that which folds longitudinally.



The Airspeed "Retractor" undercarriage folds longitudinally and is now fitted to the undercarriage on a production aircraft, and is now fitted to the undercarriage on a production aircraft.

(Left) On the D.H. "Comet" racing monoplane the wheels retract rearwards into the engine nacelles.



# RETRACTILE UNDERCARRIAGES

*A German Heinkel He.70 retracting its wheels. Note the covers for the wheel wells attached to the undercarriage structure; these covers fold up clear of the ground when the wheels are extended.*

It is well over a year ago that the first British retracting gear was fitted to a production-type aircraft. This was the Airspeed "Retractor" undercarriage in the "Courier" monoplane. Subsequently the "Envoy" and "Viceroy" were equipped with an identical undercarriage. The "Retractor" gear has been found dependable and has the advantages of being light and simple. According to its designer, it adds not more than 30lb. to the weight of the machine over and above that of a conventional fixed-type undercarriage. It is in two halves, each half comprising a Vickers oleo pneumatic shock-absorbing unit working at a pressure of 300lb./sq. in., having a gin. travel, and being hinged to the front spar, as is the bent axle. The radius-rod runs to the lower edge of the rear spar and is divided, the shorter of the links being hinged to the telescopic leg. An oil cylinder containing a piston is joined at one end to the top corner of the rear spar and at its other end to the radius rod. Oil is forced into the lower end of the cylinder, raising the piston and pulling the radius rod upwards with it.

When the piston reaches the top of its stroke, the radius rod, telescopic leg and bent axle are all housed within the wing, with about three quarters of the wheel, which is a Dunlop "semi-balloon." In an emergency it would be possible to land with the wheels in the retracted position at the expense of a damaged airscrew. In fact, Sir Alan Cobham landed a "Courier" in Malta in this manner, when he had to abandon his non-stop refuelling flight to Australia.

When the wheel is in the fully-extended position, the link in the radius rod is slightly past "dead centre," so that a wheel-load inclined backwards will merely serve to jam the piston harder against the end of the cylinder. An electrical indicator system tells the pilot the position

of the wheels, and a high-frequency horn may also be fitted to give warning when the wheels are up and the throttle is more than half closed. The pump which forces oil into one side or the other of the piston is actuated by a long handle within easy reach of the pilot.

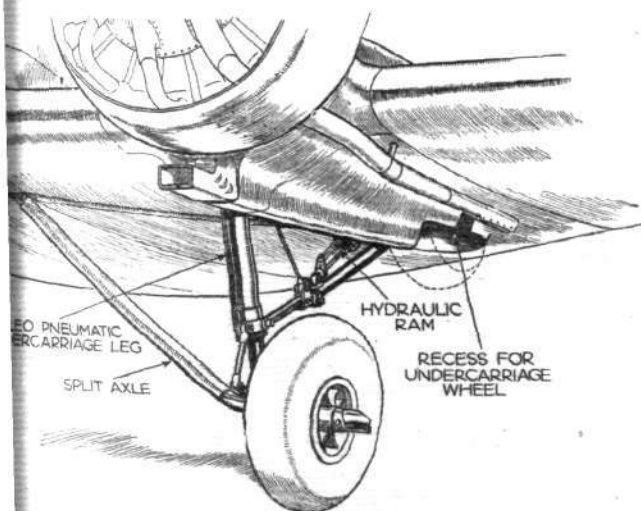
The retractile undercarriage on the De Havilland "Comet" monoplane contributed in no small measure to the outstanding performance of that aeroplane in the England-Australia race. In this design the wheels draw up into the engine nacelles, and when in a raised position their mudguards form part of the bottom fairing, leaving an opening just large enough to let the air escape from inside the engine cowlings.

The medium-pressure wheels are carried on steel forks with telescopic legs, and they are raised and lowered by a worm gear. When the drums are rotated by cables from the cockpit, they draw the worm upwards, and shorten one member, which forms one side of a triangle, thereby raising the triangle and, with it, the wheel. As the worm gear is self-locking no danger arises if the machine should land with its wheels not quite fully extended. The retracting mechanism does not prohibit the use of brakes.

## A Very Simple Design

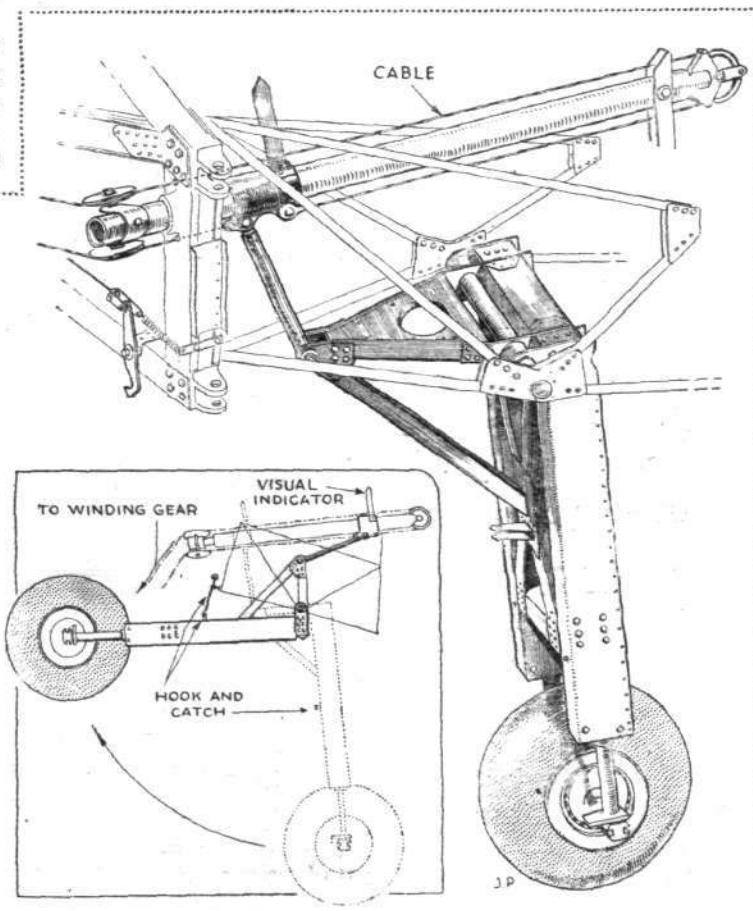
An extremely simple type of retracting gear has been produced by General Aircraft, Ltd., makers of the Monospar. As the sketch below shows, each wheel is carried on a fork, the fixed telescopic members of which are built up of sheet metal and are of rectangular section. The ends of the wheel axle are carried on tubes passing inside the upper members, springing being by compression rubbers. The built-up fork is hinged at its upper end, where there is a backwardly projecting pyramid from which a link tube passes to a collar which slides on a longitudinal member. The fore-and-aft position of this collar is adjusted by the pilot by means of cables passing over pulleys.

When the link tube is at its rearmost position it rests



the wheel exposed. This was the first British retractile undercarriage. The two drawings above show the method of

(Right) Another British gear which retracts longitudinally is that on the Monospar S.T.11.





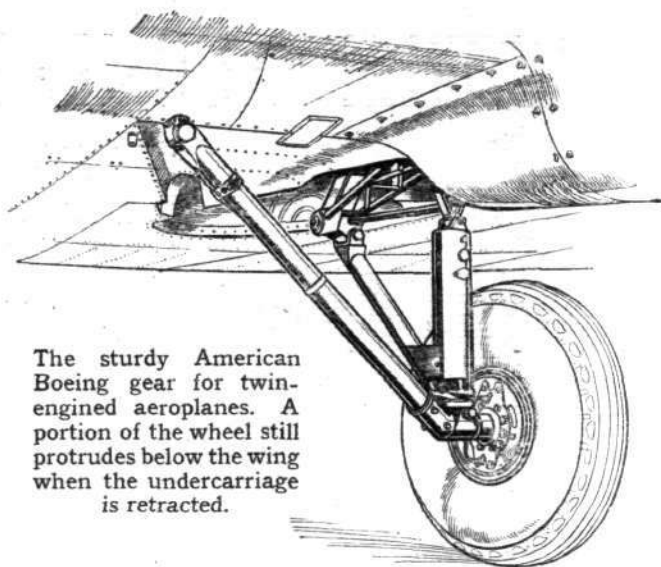
against a stop and prevents the wheel fork from being forced back. When the wheel is fully raised the collar is in the farthest forward position, as shown in one of the drawings. A visual indicator or pointer informs the pilot at any time of the position of the undercarriage, while with the wheels fully up an electrical contact is made which, in conjunction with the throttle, sounds a warning note when the throttle is closed beyond the position corresponding to cruising speed.

Several British aircraft, both military and civil, now "on the stocks" or undergoing tests have retractile landing gears. These include the Blackburn H.S.T.10, Avro 652, the large Armstrong Whitworth monoplane with four "Tiger" engines, the Bristol commercial monoplane, and the Bristol F.7/30 single-seater fighter. For new commercial types the longitudinally retracting gear seems favoured. The Bristol single-seater has fairings below its cantilever wings, into which the wheels retract.

Turning to America, in the new "Electra" the Lockheed Company has used an undercarriage in which the wheels retract into the engine nacelles, leaving a small portion of their tyres exposed. The undercarriage is operated electrically by means of gears and torque shafts. One motor operates both wheels. The operation is automatic in that, when the switch in the cockpit is thrown, the gear moves; then, when the wheels are up or down, as the case may be, the motor stops without further action by the pilot. An auxiliary hand mechanism is provided for emergencies.

One of the first retracting mechanisms to be developed in the U.S.A., the Boeing gear is operated electrically, but provision is made for auxiliary manual control. The wheels fold backwards into recesses in the under portion of the wing, leaving about half their effective diameter extending beneath the lower surface. Retraction can be effected in forty seconds, and thirty seconds are required to extend the wheels, which are of the large low-pressure type. There are three devices installed in the pilot's cockpit to give warning of the position of the gear—a dial, a red "bull's-eye" light on the instrument board, and a Klaxon horn behind the pilot's seat.

Another excellent American gear is that fitted to the

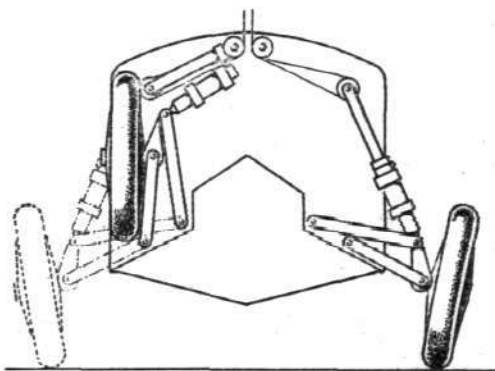


The sturdy American Boeing gear for twin-engined aeroplanes. A portion of the wheel still protrudes below the wing when the undercarriage is retracted.

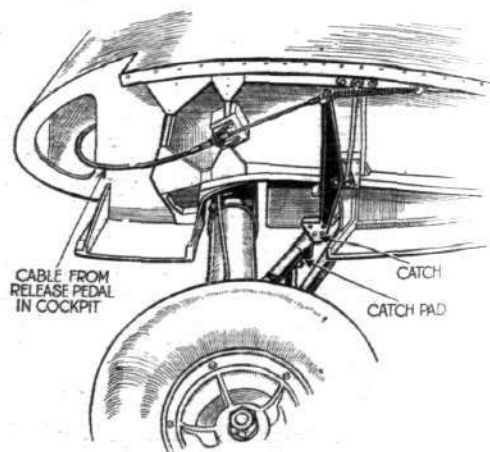
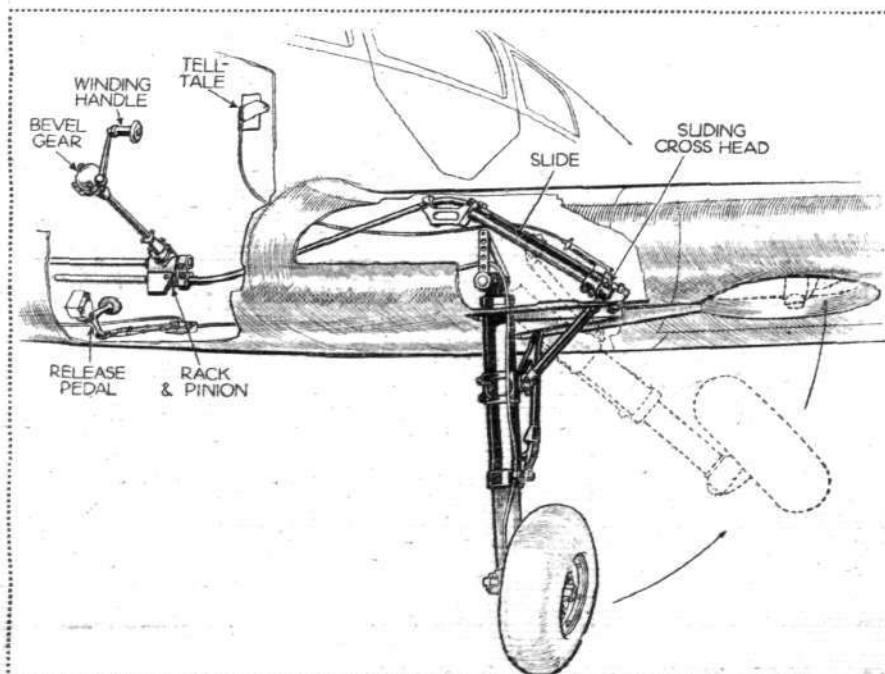
Douglas D.C.2 monoplane. This is made in two independent units which retract upward and forward into the engine nacelles. Each wheel is carried in a fork formed by two shock-absorber struts. A hydraulic pump, accessible to either the pilot or his assistant, raises the wheels in twenty-five seconds and lowers them in twenty seconds. A counter-balanced mechanism facilitates hand pumping, and the complications of electric drive are eliminated. The brake operation remains positive with the wheels retracted.

When the gear is in the "up" position the axles come up against pillow blocks built into the nacelle structure. The wheels protrude approximately nine inches, and the machine may be landed with the undercarriage up with only the air-screw tips suffering damage. In fact, since the wheels when retracted are even farther forward of the centre of gravity than when extended, there is no tendency to nose over during such a landing.

The first of the standard British retractile undercarriages to fold laterally was that fitted to the British Klemm "Eagle" cantilever monoplane. In this undercarriage the Dunlop medium-pressure wheels,



Developed originally for use on amphibians (as shown in this diagrammatic sketch), the American Grumman gear is now being fitted to landplanes. It is operated by cables.



First of the standard British gears to retract laterally, that of the British Klemm "Eagle" (illustrated in detail on the left) embodies the neat locking device shown in the small sketch above.

# CONFIDENCE



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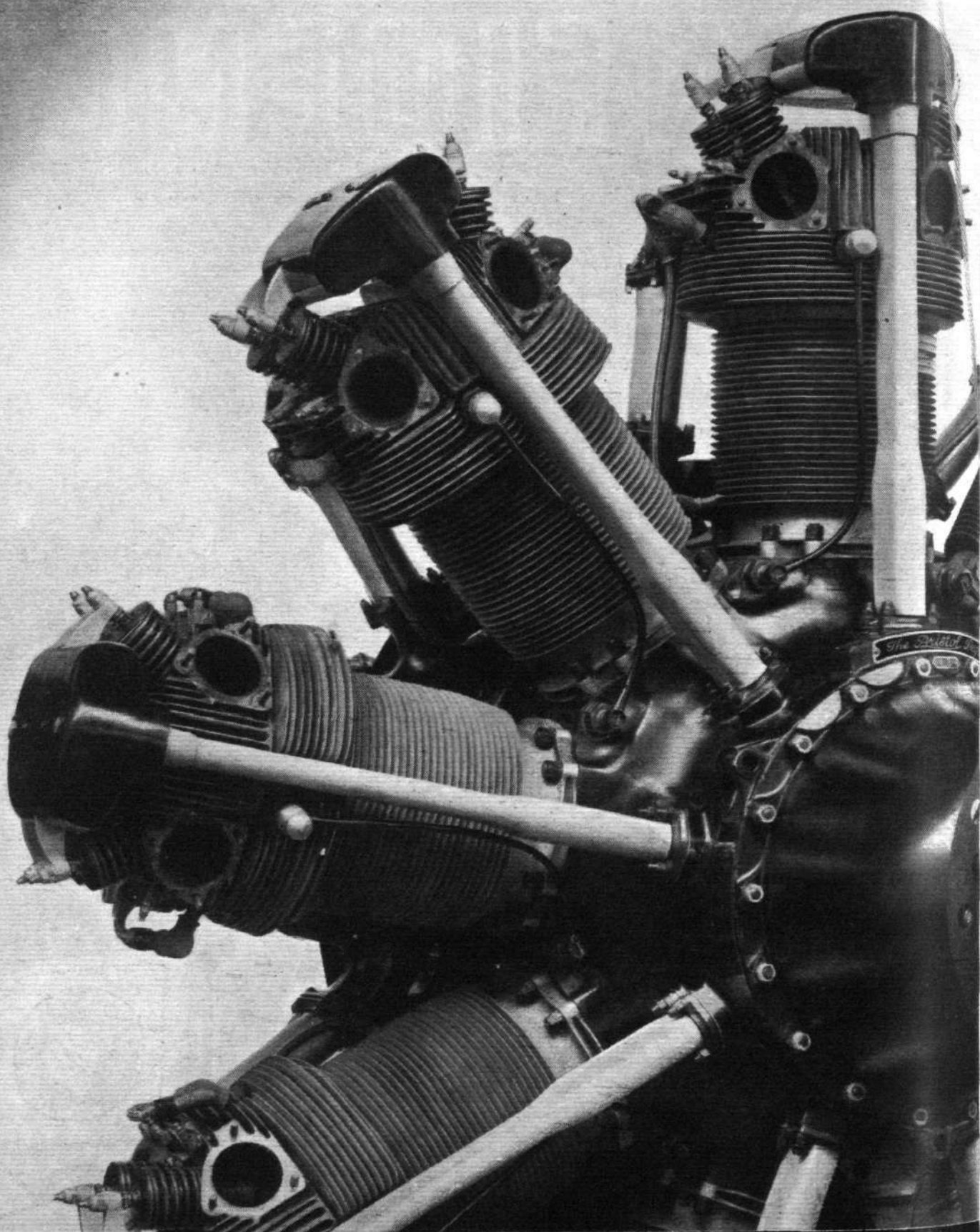
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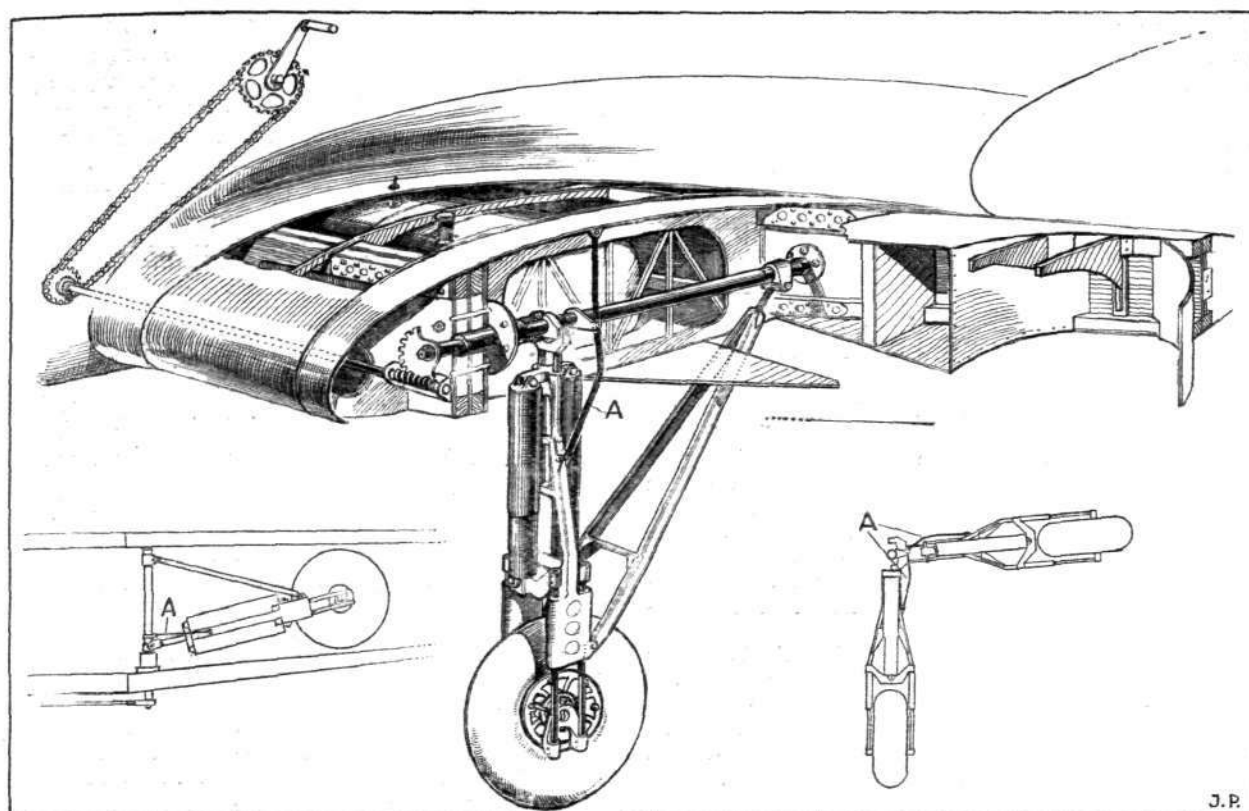
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The wheels of the Hendy "Heck," when retracted, move upward, rearward and slightly backward.

using Bendix brakes, are carried on British Klemm oleo shock-absorbers with steel springs to absorb shocks during taxiing.

By pulling the tops of the lateral bracing struts up along inclined slides within the wing, the undercarriage is raised, the wheels and struts being housed in recesses in the wing. When in the extended position the mechanism is self-locking. The wheels are retained in the "up" position by a safety catch released by a pedal in the cockpit, which also accommodates the winding handle and a visual "tell-tale" warning device.

Another interesting British undercarriage which folds laterally is that fitted to the Hendy "Heck" high-speed cantilever monoplane. The medium-pressure wheels, equipped with hydraulic brakes, are mounted in forks, each embodying two Dowty shock-absorbing units placed in tandem and mounted on torque tubes fitted across the wings. These tubes are rotated by a worm gear mounted in the leading edge, which swings the wheels upward, outward and slightly rearward into recesses in the wings.

### Electric-motor Operation

A noteworthy and sturdy American gear which folds laterally is that fitted to the Vultee V-1A cantilever land-plane. The gear is operated by an electric motor which lowers the wheels in about 16½ sec. An emergency manual control is also provided, together with suitable warning devices as well as a pointer which indicates the position of the wheels at all times. The undercarriage is composed of a single cantilever duralumin strut of rectangular section, to the upper end of which is fastened a segment of worm wheel. The lower end of this box-like strut contains an oleo shock-absorber to which a stub axle is attached. A fairing completely closes the wheel well when the gear is retracted. Running from a suitable point on the landing gear back through the fuselage, a single cable partially retracts the tail wheel when the main undercarriage itself is retracted.

The Heinkel He.70 commercial monoplane is one of the best examples of a Continental machine in which the wheels retract laterally into "pockets" within the cantilever wings. These pockets are completely covered, when the wheels are "up," by circular plates permanently fixed to the wheel struts. The lower sectors of these plates

are hinged, and are automatically pulled upwards by a simple cable attachment as the undercarriage extends; they are thus in no danger of making contact with the ground when the wheels are fully down.

The wheels are supported on a tripod embodying a normal shock-absorber and allowing for the provision of a braking system. A hydraulic cylinder, acting through a cable and pulley, raises the wheels, and the inboard member of the tripod slides along a track and folds, eventually, into a recess in the wing. The tail skid retracts automatically with the main gear. A signal plant is incorporated, and, if the wheels are not down, causes a lamp to light and a Bosch signal horn to sound the moment the engine is throttled for landing.

### Three-dimensional Action

Perhaps one of the best-known American laterally retracting gears is that fitted to the Lockheed "Orion" and "Altair," which is composed of right- and left-hand units and a combination hydraulic and cable-operating mechanism. The change in position of the wheels involves an inward, rearward and upward movement. When fully hoisted or extended the gear locks automatically. Forty seconds are required for the hoisting operation, and about nine seconds to extend the wheels. The gear extends nearly its full travel by its own weight, only a few strokes of the pump being necessary to complete the action, and an interesting claim is that the oil used in the hydraulic system flows freely, even at 40 deg. F. below zero. Besides the usual visual warning devices, a safety signal is connected to the throttle, and rings a loud electric bell if the gear is not fully extended when the engine is throttled back to 800 r.p.m.

Some highly interesting forms of retractile undercarriages have been developed for amphibians. Not the least ingenious of these is that used on the Supermarine "Seagull" biplane, in which the system consists of hinging the telescopic leg to the side of the hull, while a radius rod runs from the lower end of the leg to a point just above the chine. The upper end of the telescopic leg projects diagonally into the interior of the hull, where it is attached to the rod of a hydraulic plunger. When this plunger is operated by the pilot the end of the leg is pulled down, the outer end, with the wheel, rises, and

when the limiting position has been reached the wheel is buried in a recess in the wing, leaving only the telescopic leg and radius rod exposed.

Readers of *Flight* are familiar with certain American military biplanes in which the wheels retract into the fuselage. The type of undercarriage used has been developed from the Grumman gear originally employed on amphibians. In the gear as originally patented a deviation from a true parallelogram provides "toe-in" for the

wheels. The shock-absorber strut has the hinge offset so that when under compression the eccentricity tends to keep the strut from buckling. For retraction, cables turn a sheave, or wheel, attached to the upper end of the shock-absorber member which turns inward, thereby "breaking" the strut.

It is a curious fact that in this country, which is notoriously "pro-biplane," we have not yet fitted a retractile undercarriage to a landplane of this type.

## ICE FORMATION in CARBURETTORS

*An Interesting Problem : A Summary of an R.Ae.S. Lecture by Mr. W. E. Clothier, M.Sc.*

IN England the formation of ice in carburettors has not, perhaps, received the amount of public attention it has in America. This would appear to be due to the fact that, in the United States, fuels of very high volatility are in more common use than over here, and this fact, coupled with the possibility of a higher general humidity, with low temperatures of the atmosphere, seems more conducive to the formation of ice than do our own conditions.

Troubles appear to occur most frequently when the humidity of the atmosphere is high and the intake-air temperature between plus 18 deg. C. and minus 10 deg. C. This is according to the investigations of Mr. W. C. Clothier, M.Sc., of the Royal Aircraft Establishment at Farnborough, who read a paper on the subject before the Royal Aeronautical Society last Friday.

Mr. Clothier's work at the R.A.E. led him to the conclusion that the methods best calculated to overcome ice formation, with its consequences of a falling off in power and possible stopping of the engine, were three in number: first, the use of alcohol; second, heating the carburettor by means of a jacket; and third, heating of the intake air.

The first method has the advantage that there is no loss of power due to intake heat and that there is no necessity for awkward heating jackets. Addition of alcohol to the fuel is, however, not without difficulties as it is liable to cause corrosion of tanks and fittings, and to separate from the fuel. Mr. Clothier's suggestion was the use of a small de-icing device which, by means of small tubes having unequal apertures opening into the throttle barrel, causes unequal pressure

to be created in a small valve chamber when ice starts to form; this opens a valve and admits alcohol from a separate tank. During the discussion Mr. Fedden, designer of Bristol engines, suggested that if the Air Ministry allowed the use of alcohol for this purpose they might be induced to allow it for increasing the power output for taking-off.

To revert to the lecture, Mr. Clothier showed how heating the carburettor jacket can be achieved by the use of oil circulation, electrical means or possibly a hot water system worked from the exhaust heat. The chief point about this method is the intricacy of the casting involved in designing a jacket and the difficulty in arranging for an adequate but vital supply of heat to the throttle butterfly itself. In a supercharged engine heat might also have to be extended to the blower vanes and casing as well.

If the temperature of the intake air—the third method of preventing ice formation—can be raised 15 deg. C. and liquid water excluded from the intake, there is little probability of ice formation. A rise of 25 deg. C. should cover even the saturated air condition. Heating the intake air may, however, in some engines cause a loss of power, and this will have to be prevented by providing a cold air intake for full throttle work. A comparison of our own and the apparently much more severe American conditions is obtained from the fact that on the U.S. commercial air lines a temperature rise of 50 deg. C. is ordered; and Mr. H. P. Taylor, in the discussion, explained how, in the testing of Curtiss engines, lumps of ice had been known to break off the carburettor walls and to pass right through the engine and out of the exhaust!

### Jubilee Review of the R.A.F.

The date now decided upon for the R.A.F. fly-past before His Majesty the King is Saturday, July 6, which, incidentally, is the anniversary of Their Majesties' wedding. Mildenhall and Duxford are likely venues.

This will be the King's first review, on a large scale, of his youngest fighting Service.

### Melbourne Race in Retrospect

The Duke and Duchess of York attended a lecture given by Mr. C. W. A. Scott at the Queen's Hall on February 7, wherein he described his preparation for, and experiences during, the England-Australia Air Race.

The lecture was preceded by an interesting film showing various incidents of the race.

Mr. Scott is a fluent speaker, and he held his audience while he told them about his anxieties before the start, how he and Mr. Tom Campbell-Black found Kirkuk by luck, about their rather terrifying crossing of the Bay of Bengal, their landing at Darwin after a crossing on one engine, and their final arrival ahead of all other competitors at Melbourne.

Lord Wakefield, who presided, announced that Mr. Scott was giving half the proceeds of the lecture to the Royal Air Force Benevolent Fund. Among the many distinguished guests present were Lord and Lady Londonderry, Lord and Lady Trenchard, the Rt. Hon. S. M. Bruce and Mrs. Bruce, Air Chief Marshal Sir Brooke-Popham, and Air Marshal Sir Hugh Dowding.

### "The Lighting of Airways and Aerodromes"

A joint lecture meeting of the Royal Aeronautical Society and the Illuminating Society has been arranged for Tuesday, March 12, on "Recent Developments in the Lighting of Airways and Aerodromes." The meeting will be held, at 6.30 p.m., in the Lecture Theatre of the Institution of Mechanical Engineers, Storey's Gate, St. James's Park, Westminster.

### A Pioneer Passes

WITH the regrettable death of Mr. W. E. McArdle, of Bournemouth, which took place on Friday at the age of sixty, memories of some very interesting incidents of the early days of flying are recalled. McArdle was a true pioneer,

contributing much towards the development of flying, though well out of the limelight. The flying school, which, with the financial help of Armstrong Drexel—a wealthy American enthusiast and amateur pilot—he formed in 1910 at Beaulieu, in the New Forest, was remarkable in its completeness and efficiency. It was run on different lines from the majority of schools of that period, and was, in fact, much more like those in operation many years later. There were workshops and repair shops, and of the seven Blériots in use three were built "on the spot." One could also rent a shed for £50 per year, with the free use of the excellent 500-acre flying ground! McArdle flew about the country as if it was the usual method of transport, and frequently turned up at meetings in his Blériot complete with luggage. He learned to fly at the Blériot school at Chalons, in 1909.



W. E. McArdle, photographed at the time of his fame as a pioneer.

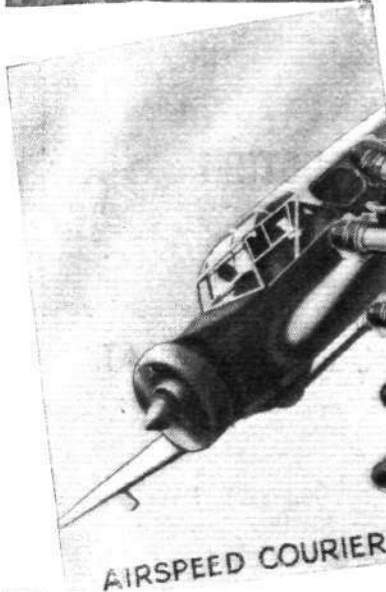




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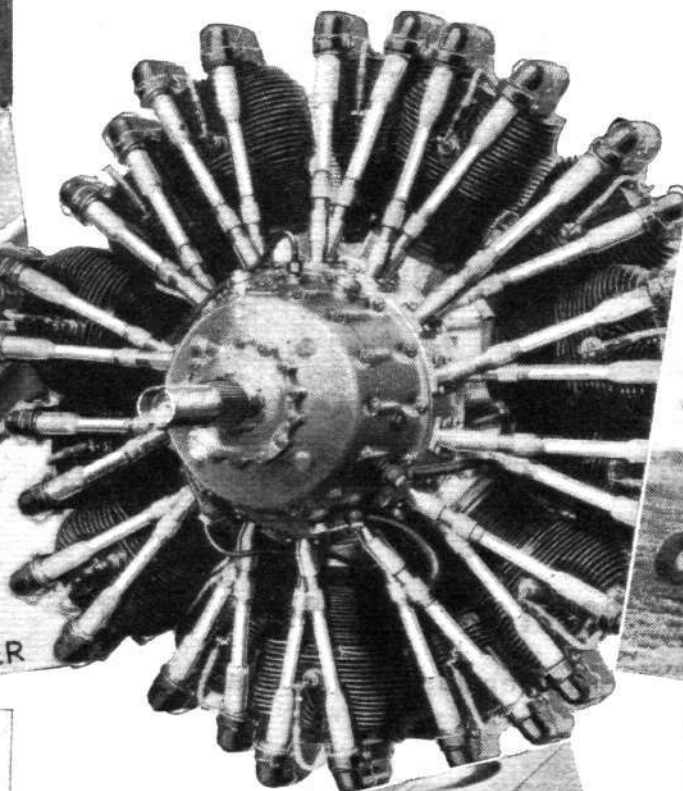


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# THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS

## Aeronautical "Training"

In a wind tunnel at the Imperial College of Science and Technology is a model of the L.N.E.R. locomotive *Cock o' the North*. Aerofoils of various shapes, fitted to the front of the engine, are being tried out in an endeavour to deflect the smoke clear of the cab.

## A "Comet" for the Air Ministry

Negotiations are in hand for the purchase by the Air Ministry of the D.H. "Comet," *Grosvenor House*, in which Mr. C. W. A. Scott and Mr. T. Campbell Black won the England-Australia race. It will be used by the Air Ministry for a series of tests and experiments.

## "Comets" for France

Following the recent visit to the De Havilland works of Col. Davet and M. Mermoz, the French Government has ordered two D.H. "Comets." M. Mermoz—the well-known French Atlantic pilot—reported very enthusiastically on his flights in this machine, and it is understood that the two "Comets" will be fitted with wireless and will be tried out on the South Atlantic service, carrying 100 kg. of mails each.

## Swedish-built "Harts"

According to reports from Sweden, an order for three aircraft is to be placed with the well-known Gothenburg shipyard, Götaverken. They will be of the Hawker "Hart" type—the licence for the construction of which has been acquired by the Swedish Government—fitted with Bristol engines supplied by Nydqvist and Holm, of Trollhättan, and are for the Swedish Navy Department.

## Radio Balloon 10½ Miles High

A radio balloon rose to an altitude of 55,777 ft. (17,000 m.) in Moscow recently. This is the first time that such a height has been attained under Moscow winter conditions. The radio transmitter acted without a hitch, and signals were received from the balloon during a period of thirty minutes by a receiver without an aerial. Regular study of the stratosphere has been carried out in Moscow since January 1 by the Aerological Department of the Central Institute of Experimental Hydrology and Meteorology. Professor Molchanov designed the balloons.

## Twenty-five Years Ago

From "Flight" of February 12, 1910.

"Army Flying School at Hounslow.—A large shed is being erected on Hounslow Heath, which is, we understand, to accommodate the Wright flyer to be used by the army officers for their aeroplane training. It is probable that the Hon. C. S. Rolls will be actively identified with the initial training of the first flying pilots of the British Army."



**WHAT A GAME (COCK)!** According to the legend attached to the news agency photograph, this illustration shows "an aeroplane which can be housed in an ordinary one-car garage—instantly adaptable to road travel—providing safe and speedy flying, the specification demanded for the popular 'plane of the future' . . . A young Leith man, after two years of secret experiment, has evolved a 'plane which he hopes will answer all these demands. Mr. Reginald N. Reid . . . has jealously guarded his secret, while he planned and laboured on his invention (shown here), which is now nearly completed."

## "Sharks" for Portugal?

The Blackburn Company is negotiating with the Portuguese Navy for the sale of six "Shark" coastal defence biplanes. The "Shark" was described in *Flight* of December 13, 1934.



**THE REPLICA:** Mr. C. W. A. Scott with a scale model of the "Comet," presented to him by *Flight* as a small mark of appreciation of his Melbourne Race success. An article on the lessons of the race, by Mr. Scott, appeared in *Flight* of December 27.

## Laura Ingalls' "Orion"

A Lockheed "Orion," with 550 h.p. supercharged "Wasp" engine, and tankage for 650 gallons of fuel, has been delivered to Laura Ingalls, the well-known American pilot. Miss Ingalls is obviously contemplating a sensational flight.

## Soviet Designs Competition

The Soviet competition for the best design of a fast aeroplane has now closed, and the first meeting of the judges has just been held at the Dzherzhinsky Club in Moscow. Altogether some thirty-eight designs have been entered, twenty of which are for single-engined, and eighteen for twin-engined machines. The former are designed to carry seven passengers and the latter twelve. Some of the designs are said to be very original, and the well-known designer Kalinin has entered the contest.

## South African Oil

The increasing demand in South Africa for liquid fuel to supply the rapidly developing air and road transport and industrial processes has focused attention upon the oil-bearing minerals to be found in the Union. The extensive deposits of torbanite at Ermelo, in the Transvaal, have proved so rich that mining and refining operations are to be carried out on an extensive scale by the South African Torbanite Mining and Refining Co., which is receiving encouragement from the South African Government. The British Salerno process—successfully employed in the distillation of coal, etc., at low temperatures—will be used.



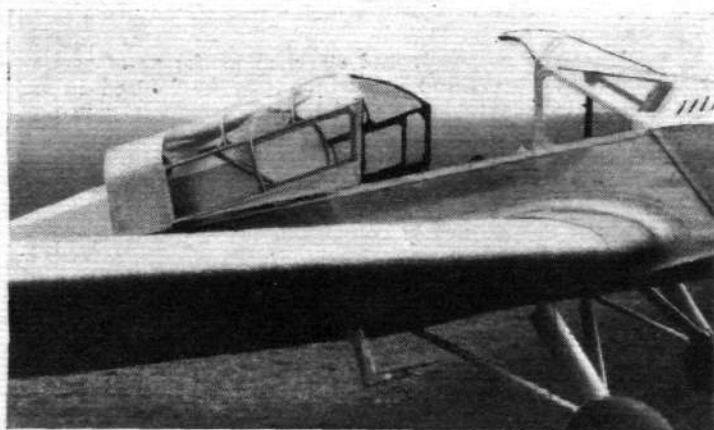
## MORE About the "SNARK"

*Some Performance Figures for Dr. N. de Bruyne's Design : Practical Details*



The "Snark," photographed on Marshall's aerodrome at Cambridge.

FOUR seats, and a range of 500 miles, is a good performance with a "Gipsy Major" when the cruising speed is 112 m.p.h. The "Snark," designed by Dr. N. de Bruyne, of Aero Research, Ltd., Cambridge, is capable of achieving these figures, and it is probable that after further tests the all-up weight will be increased. Even at its present figure the ratio of gross weight to tare weight is as high as 1.82,



The cabin top is hinged on radius rods, which lift it as it is moved back; the difficulties of sliding the roof in grooves are thus avoided.

which means that the machine, although a comparatively small wooden cantilever monoplane, carries 82 per cent. of its gross weight—an unusually high figure for this class of machine. This has been achieved, as was explained in *Flight* of December 27, 1934, by the evolution of a system of stressing which takes into full account that proportion of the stress carried by the plywood skin, both of the fuselage and the wings.

The "Snark" embodies a number of very interesting points, quite apart from its main structural features. The control column is of the jointed type, so that the top can be swung over to allow either front passenger to fly the machine. On the rear of the top of this column is another small handle which operates the brakes; a sideways motion brakes either wheel for taxiing, while pulling backwards puts on both brakes together. This last point is valuable, in that it ensures raising the elevators at the same time that the brakes are applied. This brake lever can also be locked in the fully-on position for parking, locking the elevators at the same time; and, as the ailerons are operated by an irreversible link motion, the machine is then in a suitable state to be left unattended.

Data are as follows:—

WEIGHTS:—Weight empty (excluding upholstery), 1,180 lb.; all-up weight, 2,200 lb.; wing-loading, 9.3 lb./sq. ft.; power loading, 16.9 lb./h.p.; weight/span, 1.24 lb./sq. ft.  
AREAS (sq. ft.):—Wing, 216.4; ailerons, 21.6; tailplane, 16.4; elevators, 10.4; rudder, 6.6; fin, 6.7.  
PERFORMANCE (estimated):—max. speed, 120 m.p.h.; cruising speed, 112 m.p.h.; landing speed, 40 m.p.h.; initial rate of climb, 600 ft./min.; ceiling, 15,500 ft.; range, 500 miles.

### Death of J. J. A. Gilmore

It is with deep regret that *Flight* has to record the death of Mr. J. J. A. Gilmore, of the Directorate of Aeronautical Inspection, at the age of 45. Although he had not been in very good health for some time, his death occurred with almost tragic suddenness on February 1. "John," as he was affectionately known to all his colleagues and friends, was a man of likeable personality, always willing to listen to other people's troubles and always ready with advice. His ready Irish wit was much appreciated, and at the annual dinners of the A.I.D. Technical Staff Association, of which he was the first chairman, an office which he filled with distinction up to the time of his death, hosts and guests alike looked forward to his speeches.

Mr. Gilmore entered the A.I.D. in 1916 as an examiner, and had attained, a few days before his death, promotion to the rank of Assistant Chief Inspector of Materials. His death is a great loss not only to the A.I.D. but to the aircraft industry generally.

### An Important Sheffield Merger

The electro-metallurgical, electro-chemical and other industries of Great Britain have for years been dependent on supplies of graphite and graphite electrodes from abroad. Now comes news that these products will shortly be manufactured in England. A merger has taken place between the Electrode Co., of Sheffield, Ltd., producers of amorphous carbon electrodes, and the Acheson Graphite Corporation of New York, for years the leading suppliers of graphite electrodes to the

English markets, resulting in the formation of British Acheson Electrodes, Ltd., which company will manufacture and sell both carbon and graphite electrodes as well as graphite powders. The chairman of the new organisation is Mr. C. W. Kayser, of Kayser, Ellison and Co., Ltd.

### War Birds at Dinner

A large number of war-time pilots gathered together for dinner at the Criterion Restaurant, London, last Saturday. The guest of the evening was A.V.-M. C. Courtney, who assured his audience that the Air Ministry was doing its utmost to repair the ravages caused to the Royal Air Force by the last ten years' retrenchment. Replying to those who hoped that the expansion would be rapid, he said that they must build on a base as well established as the original conception. Things which are unduly hurriedly built up, he said, usually fall down.

### Examinations for G.E. Licence Applicants

An Air Ministry Notice to Aircraft Owners and Ground Engineers gives dates at which boards will sit for examining applicants for G.E. licences, as follows:—London, weekly, on each Tuesday in April, May and June; Croydon, on the second Friday in April, May and June, 1935; Manchester, on the first Friday in June; Bristol, on the first Friday in April; Glasgow, on the first Thursday in May, 1935.

Application forms and full details are obtainable from The Secretary, Air Ministry (C.A.2), Adastral House, Kingsway, London, W.C.2.





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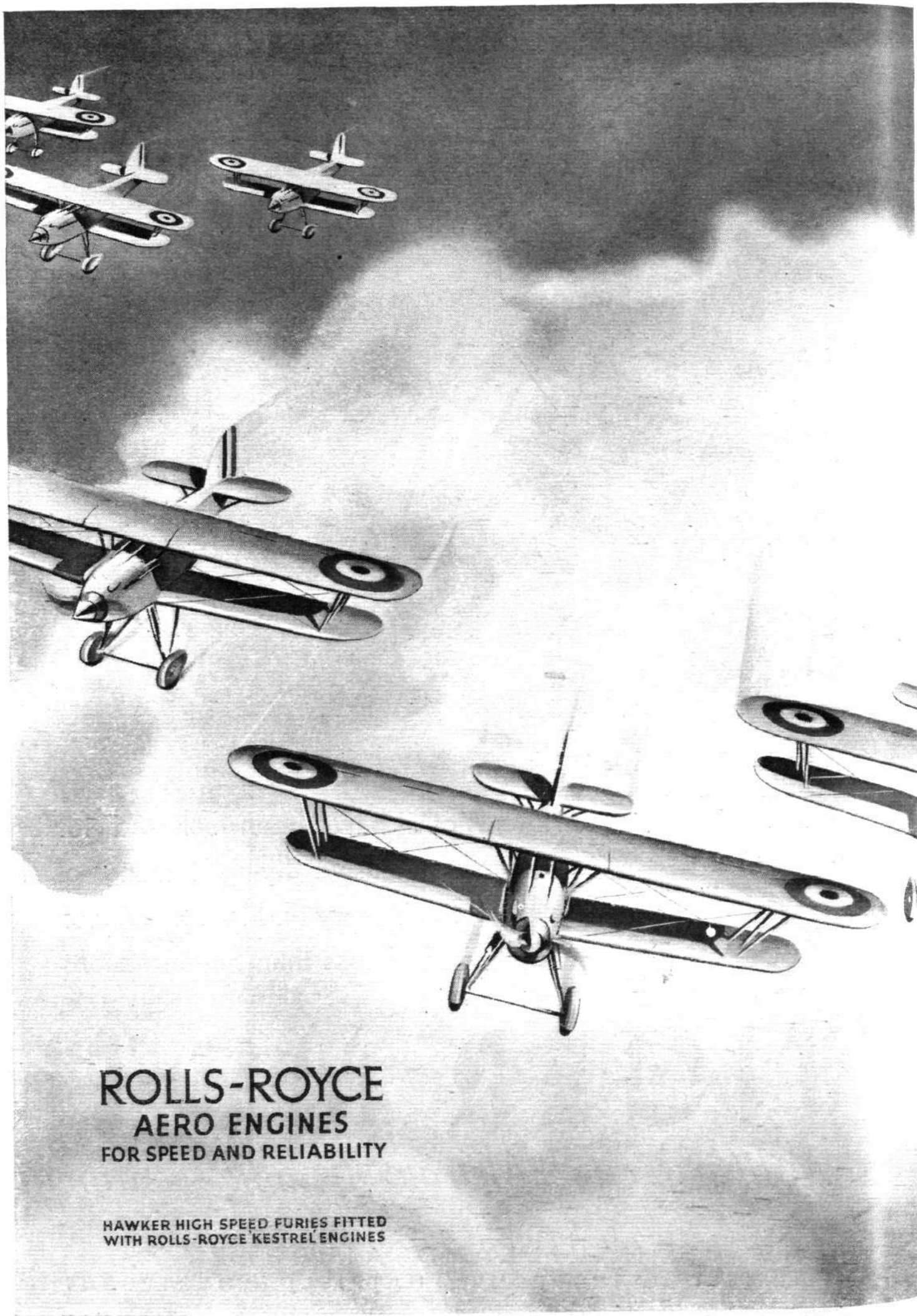
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# THE ROYAL AIR FORCE

SERVICE NOTES AND NEWS



AIR MINISTRY ANNOUNCEMENTS

## CHIEF OF THE AUSTRALIAN AIR STAFF

Air Comdre. R. Williams, Chief of the Australian Air Staff, who has recently returned to the Commonwealth from Great Britain, has been promoted to Air Vice-Marshal. This is the first promotion to that rank in the Royal Australian Air Force since its formation.

## NEW ANTI-AIRCRAFT BRIGADE

It is announced in a recent Army Order that the King has approved of the organisation and designation of the 52nd (Kent) Medium Brigade, Royal Artillery, Territorial Army, being changed to the 58th (Kent) Anti-Aircraft Brigade, Royal Artillery, Territorial Army, with effect from February 1 next. The batteries comprising the brigade are the 205th (Chatham and Faversham) Anti-Aircraft Battery, the 206th (Erith) Anti-Aircraft Battery, the 207th (Erith) Anti-Aircraft Battery, and the 208th (Bromley) Anti-Aircraft Battery.

## STAFF COLLEGE, CAMBERLEY

The undermentioned officers have completed satisfactorily the course at the Staff College, Camberley, which terminated in December, 1934:—Sqn. Ldrs. S. E. Toomer, D.F.C., *p.s.a.*, and R. J. Divers, M.B.E., *p.s.a.*

## ROYAL NAVAL STAFF COLLEGE, GREENWICH

The undermentioned officers have completed satisfactorily the course at the Royal Naval Staff College, Greenwich, which terminated in December, 1934, and Wing Cdr. R. G. Gardner, D.S.C., is entitled to the letters "q.s." after his name in the Air Force List:—Wing Cdr. R. G. Gardner, D.S.C., and Sqn. Ldr. R. V. Goddard, *p.s.a.*

## CENTRAL FLYING SCHOOL CATEGORIES

The undermentioned officers and airman pilots have been re-categorised as under:—

### A.2 to A.1

Flt. Lt. D. J. Waghorn and Sgt. Barnes, J.O.

### B to A.2

Flt. Lts. R. J. Clare Hunt, R. B. Councell, G. B. Keily, W. M. L. MacDonald, K. A. K. MacEwen, G. R. Montgomery, and N. B. Norris; F/O. R. Cleland; Sgts. Kirkland, C., Maher, W. C., Underhill, A. F., and Williams, J.

### C to B

Sgt. Cox, P.C.

The flying instructor category of the undermentioned airman pilot has been withdrawn:—Sgt. White, B.

## UPAVON AERODROME.

The R.A.F. Station, Upavon, is not to be used by visiting aircraft until March 25, 1935, except in cases of emergency.

## AIR FORCE LIST

The February issue of the *Air Force List* has now been published. It can be purchased (price 2s. 6d.) from H.M. Stationery Office at the following addresses: Adastral House, Kingsway, London, W.C.2; 120, George Street, Edinburgh; 2, York Street, Manchester; 1, St. Andrew's Crescent, Cardiff; 15, Donegall Square, Belfast; or through any bookseller.

## ROYAL AIR FORCE GAZETTE

London Gazette, February 5, 1935

### General Duties Branch

The following are granted temporary commissions as Flying Officers on attachment to the R.A.F. (Jan. 20):—Lt., R.N.—D. W. Waters; Sub. Lts., R.N.—H. S. MacN. Davenport, E. A.

## 41 F.S. REUNION DINNER

No. 41 (Fighter) Squadron R.F.C. and R.A.F. Reunion Dinner was held at the Café Royal on Saturday, February 2, 1935. Wing Cdr. R. S. Aitken, M.C., A.F.C., was in the chair and the following officers attended:—Wing Cdrs. R. S. Aitken, M.C., A.F.C., P. Huskinson, M.C., K. G. St. C. G. Leask, M.C., R. H. Saundby, M.C., D.F.C., A.F.C., and H. W. G. J. Penderel, M.C., A.F.C.; Maj. C. G. Beatson; Capt. V. H. Baker, M.C., and Mackay; Sqn. Ldrs. J. A. Boret, M.C., A.F.C. (present C.O.), C. B. S. Spackman, D.F.C., and C. E. V. Porter; Flt. Lts. W. S. Allen, H. Broadhurst, C. S. Staniland, A. H. Wheeler, W. V. Hyde, I. E. Brodie, D. N. Roberts, and S. G. H. Trower; F/O.s W. H. Husbands, G. E. MacDonald, F. G. L. Smith, J. N. McAuley, and P. W. Johnson; P/O.s M. Dawnay, E. P. P. Gibbs, H. V. Kennedy, D. Finlay, and A. F. Hards; Messrs. W. Bruce and A. Fraser. Of these, four were members of the original Squadron which went to France in 1916, and another five served with the Squadron during the war. During the evening Flt. Lt. C. S. Staniland, chief test pilot of Fairey Aviation Co., presented to the Squadron on behalf of Mr. Fairey, who was unable to attend, a very handsome silver model of the Fairey Long Range Monoplane.

## AIR NAVIGATION

It has been decided that the use of the term "air pilotage" is to be discontinued. In all correspondence and reports relating to this subject the term "air navigation" is to be used. The following changes of title will be made:—(i) Air Pilotage School to be "Air Navigation School"; (ii) The 13 weeks Air Pilotage Course to be "Short Navigation Course"; (iii) The "N" Course at R.A.F. Base, Calshot, to be "Specialist Navigation Course"; (iv) Manual of Air Pilotage (A.P. 1234) to be "Manual of Air Navigation, Vol. I"; (v) Manual of Air Navigation (A.P. 1456) to be "Manual of Air Navigation, Vol. II." Air pilotage officers will be termed "navigation officers" and will be denoted by the symbol (sn) in the List of Units in the Air Force List when filling vacancies for which officers so qualified are allowed. Specialist "N" officers will continue to be denoted by the symbol N in the gradation list and by the symbol (n) when filling vacancies for which officers so qualified are allowed.

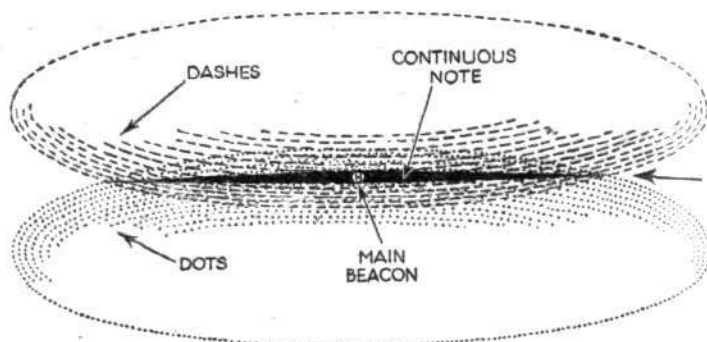
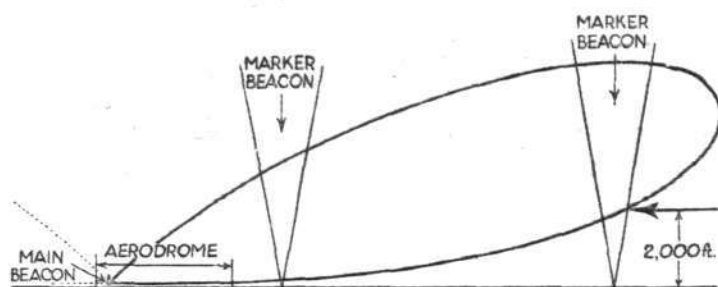
## VACANCIES FOR APPRENTICE CLERKS

The Air Ministry announces:—

Vacancies exist in the Royal Air Force for well-educated boys (in possession of an approved first school certificate) between the age of 15½ and 17 years 3 months to enter as apprentice clerks in April and July next. Entry will be by selection from among applicants with the necessary educational qualification. Preference may be given to candidates who will have attained the age of 16 years. Detailed information regarding the apprentice clerk scheme can be obtained from the Secretary, Air Ministry (Apprentice Clerks Department), Gwydyr House, Whitehall, London, S.W.1. Successful candidates will be required to complete twelve years' regular air force service after reaching the age of 18. At the age of 30 they will normally return to civil life, but a limited number may, subject to service requirements, be permitted to re-engage to complete twenty-four years' service, qualifying for pension. Boys entered under this scheme will normally receive eighteen months' training in clerical duties, typewriting, practical office routine, shorthand (for Clerks, General Duties), pay and store accounting (for Clerks, Accounting). During this period their general education will be continued under a staff of graduate teachers. An apprentice clerk at present receives pay at the rate of 1s. a day for the first year and 1s. 6d. a day afterwards, i.e., until he has both attained the age of 18 and successfully completed the course. Thereafter pay is at present issuable at rates commencing at from 3s. to 4s. 6d. a day (21s. to 31s. 6d. a week) according to the degree of success achieved at the final examination. In addition, free board and lodging and an allowance for uniform are provided.

Greenwood, T. C. G. Holford, C. B. Jelf, E. D. G. Lewin, H. E. H. Pain, R. M. Smeeton; Lt., R.M.—N. C. Riles.

The following are granted temporary commissions as Flying Officers on being seconded for duty with the R.A.F. (Jan. 21):—Lt. J. W. Deacon (The Worcestershire Regiment), Lt. P. Godfrey (Royal Artillery), Lt. R. Leigh (Royal Artillery).



These purely diagrammatic sketches show how the main and marker beacons indicate height and position to the pilot of an incoming machine. The sketch in plan on the right indicates how the dots and dashes overlap to give a continuous note along the approach lane.

The whole secret of the Lorenz system lies in the use of ultra-short waves, which have two useful characteristics. Undisturbed, they travel in straight lines unless "reflected," rather in the manner of light waves, either deliberately or by the earth itself. Consequently interference, which is one of the major problems of wireless communication in the narrow wave-band allotted to aircraft, can be prevented and the signals isolated.

In brief, the main beacon, which consists of a small shed housing the necessary generators and equipment and an aerial somewhat resembling, in shape and size, a football goal post, provides beams that are definitely shaped and placed in relation to the aerodrome. By means of suitable instruments an outside observer can be told whether he is on one side or the other and whether he is above or below the main beam, which, viewed from the side, can reasonably be visualised as a torpedo, having its pointed tail at the transmitter and its centre line conforming more or less to the gliding angle of an aircraft.

### Marker Beacons

This main beacon transmits on nine metres. At suitable distances from the landing ground, and on the line of approach, there are two marker beacons, housed in small hutches, transmitting on 7.9 metres, the beams from which can be visualised as inverted cones. Without sinking further into a subject which should only be tackled by the electrically initiated, it can be seen that the outside observer has clear information of his horizontal and vertical position in relation to the aerodrome. Effects are always rather more interesting than theories, which can only be described with the help of mentally visualised diagrams. Pictures of deformed fields are usually as accurate as those of a four-dimensional continuum seen in popular expositions of relativity!

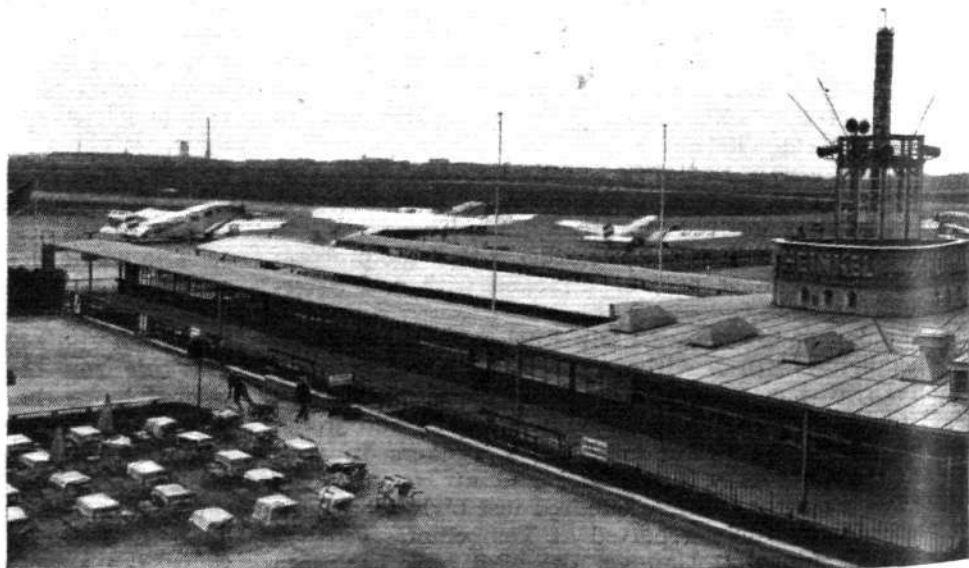
First of all, armed with a miniature aerial, a length of flex and a pair of headphones, I was marched in a semicircle around the goal posts. Distinctly enough, despite a background, I heard the "dashes" merge into a continuous and fairly deep note which then separated out into "dots." The continuous signal indicates the direction line. Over a fence and in the open western continuation of Tempelhof stands a little yellow box. That is the last marker beacon. For the moment these marker beacons are on the wrong side in relation to the main beacon, but this will be remedied in due course.

Meanwhile, a Ju 52, which had been making practice approaches during the morning, was landed and the party clambered aboard. Chock-a-block with electrical leads, instruments and hot-air de-icing equipment, this machine is used as a flying

laboratory by D.L.H. We were given headphones, and the visual recorders were indicated. These consist of an instrument with a vertically moving needle—a form of meter which gives the *strength* of the signals, and, consequently, the vertical position of the machine in relation to the main beam; another with a horizontally moving needle; and two neon bulbs. There are two aeriels, one beneath the fuselage, and resembling a short and slender hand-rail, and another enclosed in the fixed aerial king-post.

Even while taxiing the signals were obvious enough, but for the sake of clarity the first stage of the flight can be forgotten. At a height of about two thousand feet over Berlin, and some two miles from the aerodrome, we turned in order to pick up the steady note. At that distance a normal altimeter reading is accurate enough. The "dash" signals merged into a continuous note, relapsed into "dots," and again became continuous as the pilot got on to his course. The visual indicator no longer kicked one way or the other and, save for a momentary twitch, remained central. Still at 2,000ft. the Junkers was flown down the beam. Then, through the main signal, came the unmistakable high-pitched *peep-peep* of the first marker beacon, and the first neon light glowed intermittently for eight seconds.

That was the critical moment, and the engines were throttled well back. Thereafter, the reading on the signal-strength meter had to be kept constant or as near constant as possible in order to keep on the "lines of maximum strength"—which, due to the proximity of the beacon, pack closer and closer as the main beacon is approached, and eventually run along parallel to and several feet above the ground. In fact, the pilot simply



A view of the terminal buildings at Tempelhof. On the right is the control tower, and in the foreground is an open-air café.



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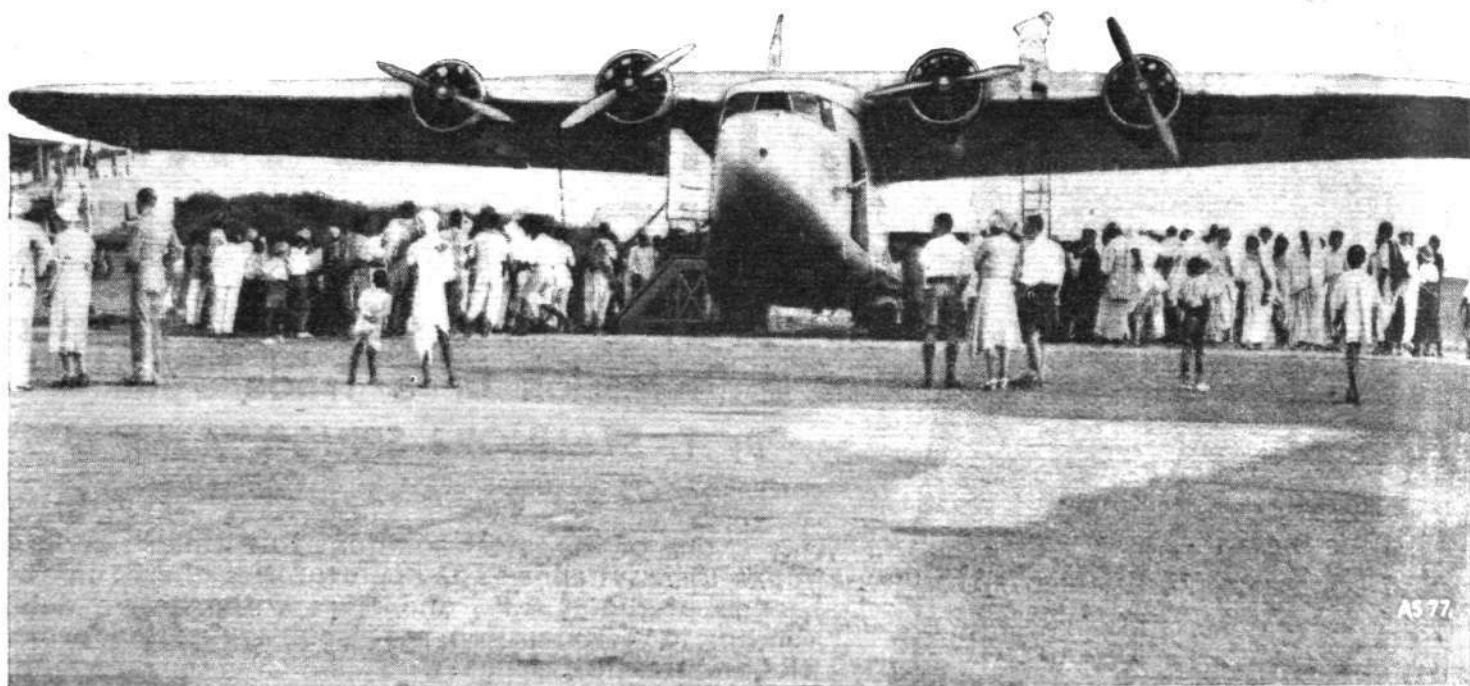
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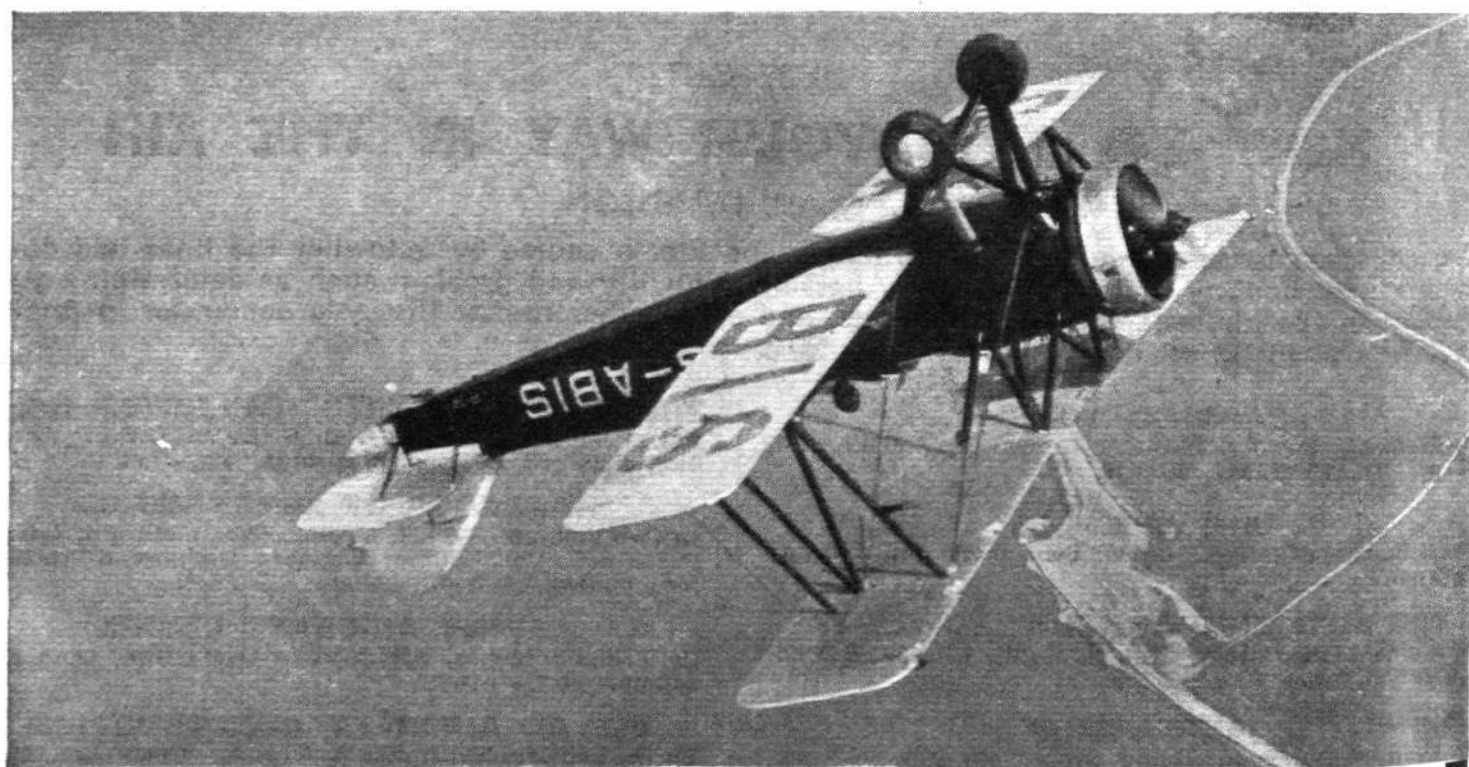
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Photo by courtesy of 'Flight'





One of Tempelhof's "platforms." Incoming and outgoing passengers on both internal and external services are carefully segregated. The machine in the background is a K.L.M. Fokker.

uses less and less throttle, and eases back the control until the machine makes a three-point contact with the earth.

Down this invisible but perfectly indicated "road" we travelled until, clearly enough above the directional signal, the last marker beacon filled the earphones with the familiar high-pitched *peep-peep* and the second neon light flickered. At that moment the blind-landing pilot cuts his throttles and flies on to the aerodrome, using the vertical-position needle and, probably, his directional gyro to hold his course. On this particular day the approach was made down wind, and the second beacon was the signal for opening the throttles wide and going around again. Obviously, in conditions of fog, there is practically no wind, so all would be well.

### An Automatic System

The main beacon, of course, delivers its signals in two directions, and if the machine is brought in down the opposing beam the "dots" and "dashes" are reversed. During the period of approach information can be transmitted and received on normal wavelengths through the standard radio equipment and, as the frequency differences are immeasurably greater on small wavelengths, the marker and main beacon signals remain clearly distinguished. The whole system is as nearly automatic as possible.

While awaiting departure from Hanover airport I had

seen a Junkers W.34 and a Focke-Wulf making a series of cross-wind approaches over the long run, and later I learned that the Lorenz system had been installed there and at a number of other German airports. Next winter we may see it in operation at one or more English aerodromes. The cost of installation is comparatively low, and the equipment in the aeroplane itself is quite light and small.

To the eyes of the Croydon-ite, Tempelhof is interesting for several reasons. The "in," "out," "internal," and "external"-bound passengers have their separate platforms. The public is very definitely encouraged to watch, and large spaces on each side of the terminal building are, in summer, arranged as a form of beer-garden.

The hangars and workshops lie on either side of the centre buildings, and it is significant that the D.L.H. fleet of all-metal machines spends most of its time out in the open with the "Hornet" engines in pre-heated

"nosebags" during the winter.

Only ground traffic-control is done from the actual control tower with radio operation at one end of the East to West run; D.L.H. themselves have complete control of that side of the business.

The tarmac area is delightfully extensive, but the runways are of a prehensile character—sufficiently long to allow machines to get their tails well up—and all taxi-ing is done on the perimeter of the aerodrome. Incidentally, the advantage of a taxi-ing runway is considerable after a long spell of bad weather; at Schiphol, during the return trip, the Ju. 52 was, at one moment, more or less out of control in a wild slide across the sodden turf.

On the tarmac at Tempelhof were two Dornier freighters, and people in this country may be interested to know that several of these machines are owned by the German railways and maintained by D.L.H. The railway company finds that for certain high-speed work aeroplanes are more economical than surface transport.

So, homeward—feeling that Germany had stolen a very real march on the rest of the world in spite of the fact that after Versailles the vanquished had been forced to plough their own furrow as far as wireless development was concerned. In the hangar at Hanover stood an Albatros L.30 of genuine war-time manufacture, with cable bracing and anemometer speed indicator. It is still being flown, and is affectionately labelled *Onkel Robert*.

## Diary of Forthcoming Events

Club Secretaries and others are invited to send particulars of important fixtures for inclusion in this list.

Feb. 15. Annual Aviation Ball, Bristol and Wessex Aeroplane Club, Grand Spar Hotel, Clifton.

Feb. 15. D.H. Technical School Annual Ball.

Feb. 16. Rugby: R.A.F. v. R.N., Twickenham.

Feb. 22. "Research in the R.A.E. Tank." R.Ae.S. Lecture by Mr. L. P. Coombes.

Feb. 27-28. R.A.F. Individual Boxing Championships, Uxbridge.

Mar. 1. Annual Dance, Leicestershire Aero Club, Palais de Danse, Leicester.

Mar. 1. "Fuels for Aircraft Engines." R.Ae.S. Lecture by Mr. E. L. Bass.

Mar. 5. "Problems of Cold Presswork." Joint R.Ae.S. and Inst. A.E. Lecture by Dr. H. Gough and Dr. Desch.

Mar. 12. "Recent Developments in the Lighting of Airways and Aerodromes." Joint R.Ae.S. and Illuminating Engineering Soc. Lecture, Inst. M.E., Storey's Gate, Westminster.

Mar. 15. "New Developments of the Autogiro." R.Ae.S. Lecture by Senor Juan de la Cierva.

Mar. 15. Annual Dinner and Dance. Cinque Ports Flying Club Royal Pavilion Hotel, Folkestone.

Mar. 23. Rugby: R.A.F. v. Army, Twickenham.

Mar. 29. "Piloting Commercial Aircraft." R.Ae.S. Lecture by Sqn. Ldr. H. G. Brackley.

Mar. 29. Annual Dinner. Norfolk and Norwich Aero Club, Mousehold Aerodrome.

Apr. 12. "Commercial Aircraft." R.Ae.S. Lecture by Capt. G. de Havilland.

May (Date not yet fixed). Wilbur Wright Lecture, R.Ae.S., by Mr. W. D. Douglas.

May 29. Household Brigade Flying Club. Night - Flying Demonstration, Heston.

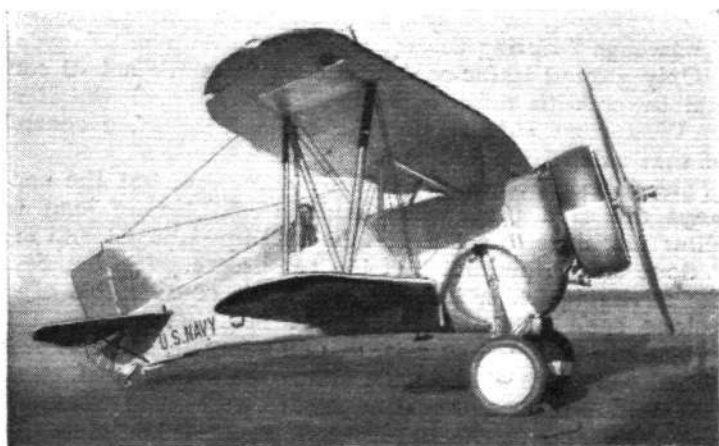
June. 1. Brooklands "At Home."

Aug. 24-25. Third International Flying Meeting, Lympne.

Sept. 6-7. King's Cup Air Race.

Part II : *Single-seater Fighters : A*  
*233 m.p.h. High-altitude Fighter :*  
*The Airship "Macon's" Fleet of*  
*"Sparrowhawks"*

CONTINUING the review of U.S. Navy types, we find the modernised Curtiss "Hawk" appearing as the F11C-3. This is the redesigned single-seater biplane fighter, but with an undercarriage which retracts into the sides of the fuselage. It was designed for high-altitude fighting and bombing, and is the result of twelve years' experience on the part of the Curtiss people. Fitted with the Wright "Cyclone" R-1820-F3 supercharged engine of 700 h.p., it has a top speed of 233 miles an hour. With an absolute ceiling of 27,000ft., it climbs 10,000ft. in five minutes, and has a cruising radius of 559 miles. Dimensions and weights of this machine are: Span (top), 36ft. 6in.; span (lower), 26ft.; length, 23ft. 4in.; height, 9ft. 11½in.; chord (top), 73in.; chord (lower), 60½in.; wing area, 262 sq. ft.; weight empty, 3,083 lb.; weight loaded, 4,160 lb. Two Browning



A bomber-fighter—the Curtiss BF2C-1 single-seater with 700 h.p. "Cyclone" engine. Note the sliding cockpit cover and retractile undercarriage.

0.30-calibre machine guns make up the armament and are mounted one on each side of the fuselage, with the barrels running between the engine cylinders.

Almost identical with the F11C-3, the BF2C-1 single-seater bomber-fighter is now being posted to squadrons on carrier duty. Only a few minor changes were made in this machine, which is powered with the Wright "Cyclone" SR-1820-04 engine of 700 h.p. Inasmuch as it is practically the same machine, it is believed that the former is regarded as too slow for strictly fighting duties, in spite of its speed of 233 miles an hour. It was then redesignated for dive-bombing. The same type of retractable landing gear is provided as in the F11C-3.

Shortly to be replaced by the more modern fighters, the Curtiss F11C-2 is an earlier "Hawk" single-seater. The landing gear is of the old-style rigid type and the wheels are fitted with spats. Powered with a Wright "Cyclone" SR-1820-F of 700 h.p., it has a top speed of over 200 m.p.h. at 10,000ft. Cruising, it has a speed of 170 m.p.h. and lands at 60. More often known as the "Goshawk," it has the following dimensions: Span (top), 31ft. 6in.; span (lower), 26ft.; length, 22ft. 8½in.; height, 9ft. 8½in.; wing area, 252 sq. ft.; weight, fully loaded, 3,409 lb.; useful load, 686 lb.; ceiling, 30,000ft.

Considered too slow for strictly fighting duties, the Boeing XF6B-1 single-seater will shortly have its designation changed to the bomber-fighter class, as it did not come up to fighter standard and was rejected. Differing from its immediate predecessors turned out by Boeing, it



The Boeing XF6B-1, which has a 700 h.p. "Twin Wasp Junior," has transferred from the fighter category to the bomber-fighter class.

## UNITED STATES

has a cantilever streamlined landing gear with no axle, and the fuselage contour is of slightly different design. It is powered with a 700 h.p. Pratt and Whitney "Twin Wasp Junior." Dimensions are: Span, 28ft. 6in.; length, 22ft. 1½in.; chord (both wings), 4ft. 8in.; gap, 4ft. 10½in.

Included with the fighters received for test was the Berliner-Joyce XF3J-1. This is a single-seater biplane with a peculiar "butterfly" top wing. In its tests it was considerably slower than it should have been and was outclassed by others of later design. The power plant is the 700 h.p. Wright "Cyclone" R-1510. A standard fixed-type landing gear is installed, and it is quite possible that the machine may be returned for modifications to bring up its speed. It also has the new sliding cockpit cover.

While reviewing the fighter types it would not be amiss to mention the tiny airship fighters of the Curtiss F9C-2 class. These little single-seater biplanes are carried aloft by the rigid airship *Macon* for its defence, and it is now no secret that the *Macon* has a hangar inside her huge structure that houses five of these machines. They are known as "Sparrowhawks" and are powered with the Wright "Whirlwind" 420 h.p. engine. They have a span of 25ft. 6in., and a length of 20ft. 1½in. A special hook on the top wing constitutes the means by which they make contact with the airship while in flight. They are also equipped for carrier landings.

Four observation types have also been recently submitted for tests. These are all two-seaters and include the Curtiss X03C-1, which has a cruising speed in the neighbourhood of 170 miles an hour. It is fitted with slots and flaps to reduce the landing speed, and is believed to be powered with a Wright "Cyclone" engine. The Douglas X02D-1 is also reported to be of approximately the same speed, and likewise is provided with slots and flaps. It had the misfortune to crash during its test, as the result of a faulty landing gear, but was rebuilt and



The Sikorsky XSS-2 amphibian fighter scout. The engine is the SD-1, of 550 h.p.





utility duties—the new Grumman XJF-1 amphibian three seater. Its 10 h.p. "Twin Wasp" R-1830-62, gives a top speed of 197 m.p.h.

## NAVY AIRCRAFT

is awaiting the final outcome of choice with the others. These include the Vought Xo5U-1 and the Berliner-Joyce XoJ-3. The former is similar to the others on test, while the Berliner-Joyce is an amphibian.

Bellanca has delivered a scouting type, the XSE-2, which is a two-seater high-wing monoplane. In this machine the rear of the cabin is cut away to allow the gunner a clear field of fire. Originally it was produced as the XSE-1, but a crash at the factory hampered its delivery. It was, however, rebuilt with numerous changes, and from all indications is very much of a scrapper. It is believed to be powered with a Pratt and Whitney "Hornet" of about 700 h.p. A Vought model, the XSBUI scout-bomber, has also been delivered. It is typical of the Vought types now in service, being a two-seater biplane.

With a drastic change of design for a naval bombing aeroplane, the Consolidated concern have produced their XBY-1. This is an all-metal adaptation of their stock model commercial "Fleetster" monoplane, and is a two-seater. The machine has proved itself to be very sturdy for normal bombing and has a high speed, the power plant being a "Hornet" giving about 700 h.p.

Another Consolidated model is the XB2Y-1, a standard-type biplane two-seater dive-bomber. It has not been generally regarded as in the competition, as its performance has not come up to that called for. Great Lakes entered their XBG-1, of the same type, powered with a Pratt and Whitney "Twin-Wasp Junior" 625 h.p. fourteen-cylinder engine. This machine carries a large load and is very fast for a two-seater of that class.



Consolidated XBY-1 (575 h.p. "Hornet" B-1), is an all-metal adaptation of the commercial "Fleetster."

### New Observation, Bombing, and Transport Machines : Rumours of a 200 m.p.h. Torpedoplane

BY AN AMERICAN CORRESPONDENT

The Douglas Company recently delivered their XT3D-2, a four-seater torpedo-bomber biplane, comparable with the British T.S.R.s, and powered with a Pratt and Whitney "Twin-Wasp" SR-1830-C of 850 h.p. The crew sits in tandem and are enclosed by a sliding transparent cover. It was built for carrier duty, and, most likely, will replace some of the older models now in service. Douglas also has in progress the XP3D-1, a monoplane flying boat of the patrol class. It has been reported that this will appear with two Pratt and Whitney engines. Rumours have it that both Douglas and Northrop are interested in building a high-speed torpedoplane. The specifications called for in this type require a speed of at least 200 miles an hour.

In the large patrol flying boat types Consolidated is furnishing additional machines of the P2Y-1 class. With a few modifications, they will be identical with those comprising



Of rather "British" appearance—the Douglas four-seater torpedo-bomber (850 h.p. "Twin Wasp" SR 1830-C).

the squadron which last year flew from California to Hawaii for a change of station. A large number of them are under construction to replace some older types now in service. They are powered with two 700 h.p. Wright "Cyclones" mounted on their monoplane wings. They have a top speed of 142 m.p.h., and can cruise at 115 miles an hour for 3,000 miles. Dimensions are: Span, 100ft.; length, 61ft. 9in.; height, 17ft. 3in.; wing area, 1,513 sq. ft. The hull construction is of aluminium alloy, and a crew of five is carried.

Recently adopted for service was an interesting utility amphibian known as the Grumman XJF-1. It is a three-seater, powered by the Pratt and Whitney "Twin-Wasp" R-1830-62 of about 800 h.p., which gives it a speed of 197 m.p.h. The crew may be enclosed by the sliding cockpit cover, and the wheels fold up into the sides of the fuselage. The machine as a whole is very similar to the older Loening amphibians, and this may be attributed to the fact that Mr. Grumman was previously one of the Loening engineers who was responsible for the original design.

Like the Army Air Corps, the Navy felt the need of fast transport machines to carry personnel and supplies. The most recent adoption in this case has been the Douglas R2D-1, which is none other than the famous DC-2 air-liner.

Many machines of the Douglas RD-3 "Dolphin" class (amphibian-transport type) are in service. They are of monoplane design and powered with two Pratt and Whitney Wasp 450 h.p. engines. The cabin contains seven seats in two rows.

The Bellanca XRE-2 is also undergoing tests as a transport. It has the appearance of the well-known commercial type, and has a 550 h.p. Pratt and Whitney engine.

## PRIVATE FLYING

LORD SEMPILL, A.F.C., F.R.Ae.S.,  
CONTINUES THE STORY OF HIS  
FLIGHT TO AUSTRALIA

HAVING experienced pretty good weather between Calcutta and Victoria Point, I was not to get through Malaya without a taste of what the weather can be from a flying point of view. It was fine when I left Victoria Point at 7.30 a.m. in the hope of making Singapore before night, but I was not carrying sufficient petrol to fly the distance non-stop. Setting off down the coast of Lower Siam, I had not gone more than thirty miles when I ran into a large area of torrential rain, with clouds at fifty feet and less. I tried to get round by going out to sea, but as conditions got worse, and there was always the chance of hitting one of the many islands off the coast, I decided to turn back, and, after an hour's flying, reached the aerodrome.

In landing I unfortunately struck a ridge, bent the tail wheel fork of my machine and buckled the spat, which I had to remove. The fork itself was not too badly damaged, and I made ready for another start if the weather gave signs of improving further south. Although I carried a spare fork I did not want to fit it unless necessary, as the low-pressure tail wheel unit was one of my greatest assets. With the aerodromes and landing places in the condition met with at many stages of my journey, I found the fitment of the greatest possible value. Knowing that I should have to fit the spare fork later, I took the precaution of arranging for the makers to send another spare to Singapore, so that I should be equipped for the return journey.

On many occasions I could not possibly have handled my "Puss Moth" on the ground, or taken off, had it been fitted with a skid or the solid rubber type of wheel. In this particular instance I was fortunate not to have done more damage.

### Guided to Earth

GETTING better reports through a few hours later, I was therefore ready to make a fresh start, although I knew I could not get further than Penang after so much delay.

Again taking off, I passed round or through several storms, and came through Siam in about four hours, and had a look at Alor Star. The country was in many places under water, and the aerodrome looked and was very wet. The surface at Alor Star is harder and firmer than that of other aerodromes in this part of the world, but needs better drainage. However, on this occasion landing was out of the question, and I flew on to Penang.

I was, in any case, anxious to land at Penang, as I had very pleasant memories of a former visit when I was last out in the East. As I neared the aerodrome rain fell heavily and visibility was poor; when actually in sight of my objective I was met by a machine which I afterwards found was piloted by Mr. Greenwood, the chief instructor of the Penang Flying Club. I soon saw that he had come to guide me in, and from the look of the aerodrome, which was covered with water in many places, I was glad to follow his lead, as otherwise I should have been quite unaware of the most suitable place to land. Following Mr. Greenwood in, I managed to land all right, though on touching the ground I was deluged by mud and water and cut grass. By the time we had taxied to the hangar our machines were in a filthy condition.

Plenty of assistance was at hand, however, and I soon

## Malaya, Mud and Rain

had some Chinese and Malay washers at work, but it was a couple of hours before the "Puss Moth" was clean again. This is one of the difficulties the Club has to contend with here, as during the rainy periods machines have to be washed every time they come in, which, of course, helps to make the upkeep expenses high.

I was greatly impressed by the efficiency and keenness of the officials and members of the Penang Flying Club. Although the official opening of the Club only took place last August, good progress has been made, and Mr. Greenwood—whom I knew well when he was assistant pilot to Lord Malcolm Douglas-Hamilton on the *Cloud of Iona*, which was engaged on the Isle of Man service between Douglas and the mainland—told me that he was averaging nearly one hundred hours' flying instruction per month. The captain of the Club is Mr. V. Mercer Smith, a cousin of Sir Charles Kingsford Smith, and he is doing fine work. There is an excellent committee, whose activity does them much credit. A large hangar and an excellent clubhouse has been built, and the flying stock includes three up-to-date "Moth Major" machines. The flying members comprise Malays as well as British, and include two Chinese ladies, who are doing very well.

### Cheap Flying

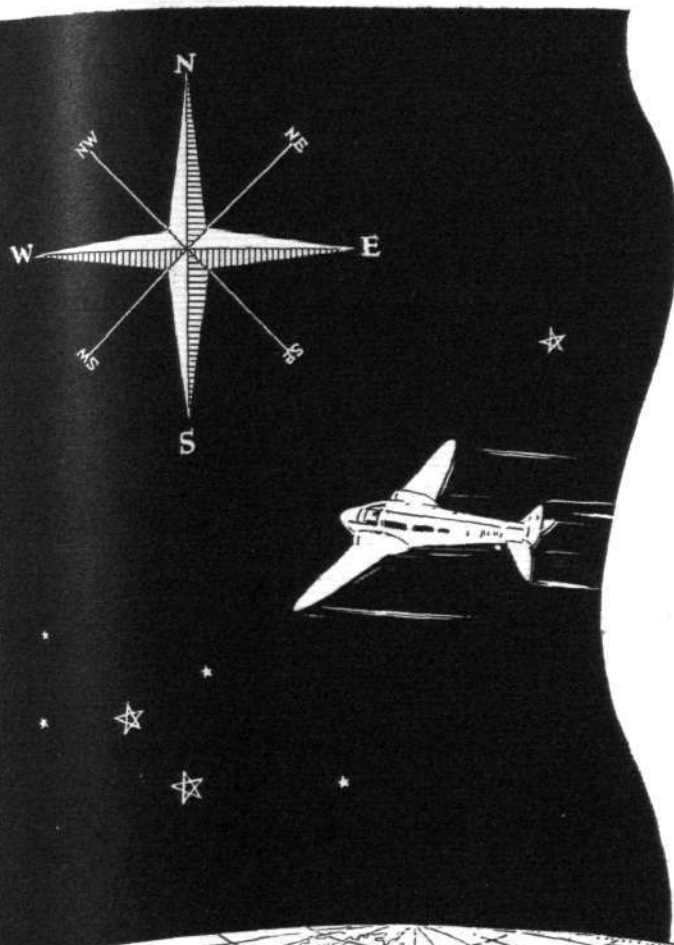
AS in the case of the Kuala Lumpur Flying Club, which has been established several years, the Penang Club received an initial grant of \$40,000, plus a grant for equipment during 1934 of \$25,000. The flying charges are low, according to our standards, being about 21s. per hour for instruction and 14s. per hour for solo flying.

In view of its importance as being on the main Empire air route, Penang must have an aerodrome which is usable at all times, and this is recognised by the authorities. The visit last autumn of Sir Philip Sassoon, the Under-Secretary of State for Air, gave a fillip to "air-mindedness" in the Malay States, and, largely as a result, the Legislative Council has voted the sum of \$250,000 for the improvement of the aerodrome. Although this vote is included in next year's Budget, there is an urgent call for the work to be put in hand without delay. The construction of runways for an aerodrome such as that at Penang is essential, and in view of the fact that prevailing winds do not vary very much in direction, two strips of properly laid and drained metalled surface would make all the difference between an impossible and an efficient landing field.

### Pioneer Work

I LUNCHEd with the Hon. A. M. Goodman, the Resident Councillor, who is a great champion of aviation, and has done a great deal to focus attention on its importance to the Settlement. The three flying clubs—Kuala Lumpur, Singapore, and Penang—are doing real pioneer work in the Malay States, and flying visits by the club members to various centres of population within the Peninsula have done a great deal to make the public realise the advantages to be gained from air transport. In consequence, there is a growing need for local services and air taxi facilities. The success of such enterprises is entirely dependent on a system of ground organisation which will ensure regular and continuous operation. The initial cost of landing grounds which will render this possible in such a place as Malaya is bound to be comparatively high, but there is a growing section of the community which believes it to be well worth while.





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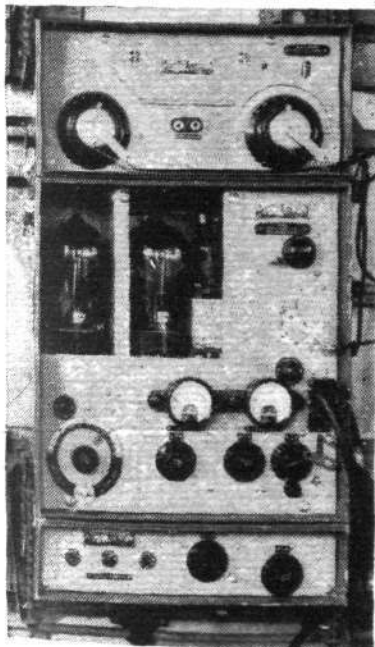
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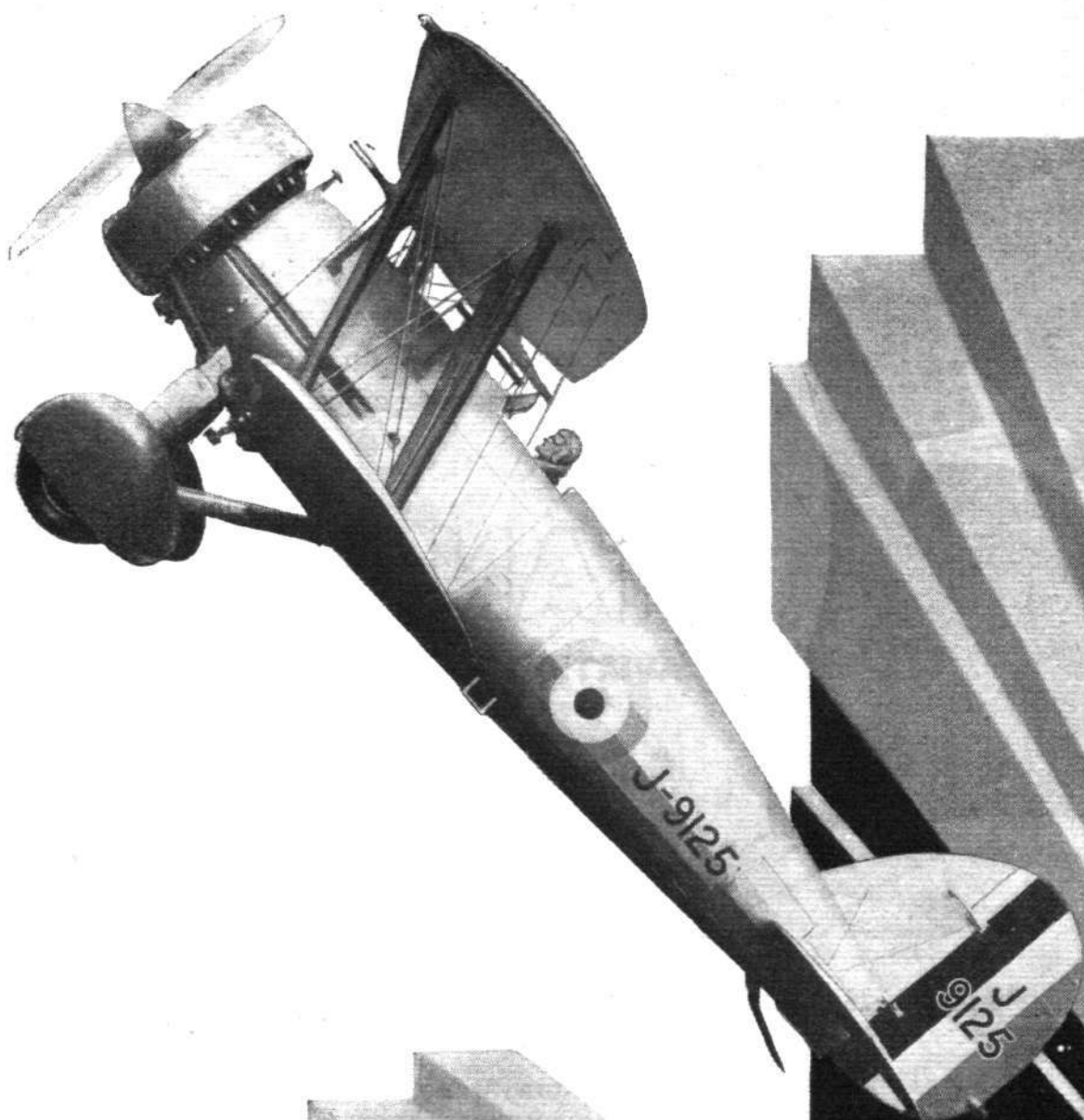
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Private Flying

## FROM THE CLUBS

*Events and Activity at the Clubs and Schools***WITNEY AND OXFORD**

The date of the official opening of the club has been provisionally fixed for June 15. Flying time for the week ended February 10 amounted to 18 hr. 10 min., 6½ hr. of which were solo.

**CASTLE BROMWICH**

No flying was possible on three days of the week ended February 7 owing to high wind, but 4½ hr. dual and 10 hr. 24 min. solo were recorded. Mr. Cox successfully passed his "A" licence test. The monthly dance on February 2 was well attended.

**CAMBRIDGE**

Flt. Lt. Russell has joined the instructional staff of Marshall's, bringing it up to three. Two new members, Messrs. Scott and Jones, joined during the week, and Mr. Gay made his first solo flight. Messrs. Panes and Woolley passed their "A" licence tests. Flying times for the week ended February 8 are dual 31 hr. 20 min., and solo 10 hr. 15 min.

**HANWORTH**

Members have been interested in the new types of Auto-giro which have been flying recently. New members include Mr. J. MacMurdo and Cdr. J. Clouston, R.N. Flying time for the week amounted to 29½ hours, although three non-flying days were recorded. This improvement is due mostly, no doubt, to the cheap rates for the hire of aircraft now in force.

**LIVERPOOL**

Weather conditions during the past fortnight have been appalling, and gales and fog were frequent. Despite this handicap 29½ hours flying were recorded, making a total for the month of January of 100 hr. 15 min.

A "treasure hunt" and an informal dance will be held at Hooton on Saturday, February 16, commencing at 5.45 p.m.

**ABERDEEN**

The Social Committee of the Dyce Aero Club has now decided to hold a dance once a month in the clubhouse, with cinema shows once a week.

Despite blizzards and heavy gales the School, under the tuition of E. A. Starling, managed 7 hr. 30 min. dual instruction last week. Under the direction of Capt. E. D. Ayre, solo pupils have been progressing favourably.

**HATFIELD**

New members of the London Aeroplane Club include Mr. J. S. Meikle, Señor C. A. Costa Macedo, and Mr. C. E. Bleck. The last two are flying a "Comet" to Portugal, and thence to Brazil via Cape Verde Islands.

Flying by the Royal Air Force Club has been somewhat curtailed owing to machines undergoing overhaul. The club is holding its first dinner on Friday, February 15, at the Royal Air Force Club, Piccadilly. Lord Trenchard will attend. The date of the third annual display has provisionally been fixed for Saturday, June 15.

**BRISTOL AND WESSEX**

The club will again be organising the race for the S.B.A.C. Challenge Trophy this year. It has been suggested that the race be held on Empire Air Day, May 25.

Messrs. I. Jenks and C. F. Key have completed their tests for "A" licences, and Dr. G. E. Pepper has been enrolled as a new pilot member.

The deciding squash match between the Bristol and Wessex Aeroplane Club and the Bristol Aeroplane Company's Flying School was played at Whitchurch on February 6, resulting in a win for the club by 3 ties to 2.

**READING**

Lord Apsley, D.S.O., M.P., has consented to come to Reading on Sunday next to introduce Mr. and Mrs. George Royle, when they will arrive to open the new navigation room which they have equipped and given to the club in memory of their son, the late Gerald Royle, who was killed at Scarborough last summer. It is hoped that members will come to the aerodrome at 3 p.m. for this occasion.

The aerodrome has seen some activity in connection with the new National League of Airmen. Mrs. Elise Battye started off last Monday on a tour of British aerodromes, carrying literature and forms on behalf of the League.

**BROOKLANDS**

Flying times last week were somewhat lowered owing to very high winds, but a very successful landing competition was held. Mr. Vaillant has taken his "A" licence.

Capt. Findlay flew to Paris and back on Tuesday of last week with Mr. Tony Downing, of London Film Productions, Ltd., in the latter's "Leopard Moth." Capt. Davis and Mr. Ken Waller have booked cabins on the *Homer*, sailing from Southampton on March 16 for a 28-day cruise to the Mediterranean and Palestine. Members of other clubs who are interested are asked to get in touch with Capt. Davis as soon as possible.

**AIR SERVICE TRAINING**

A new term for the long commercial course started at the beginning of January. There are now thirty-nine pupils taking the course. New arrivals include Mr. M. Bowker, a South African air line pilot, and Mr. R. C. H. Monk, of Spartan Air Lines, who are taking the blind flying course. Ten students have joined to take "A" and "C" ground engineers' licences.

The activity on the "ground" side has necessitated the enlargement of both staff and workshops. During January 574 hours were flown—an increase of 50 per cent. over the corresponding month last year.

**DUBLIN AIR FERRIES**

The Dublin Air Ferries, Ltd., flying school is now working to full capacity. Last week-end there was held an altitude contest for pupils under instruction. The machine took off from a given point and the climb and the return glide had to be as near 60 m.p.h. as possible. Anyone exceeding fifteen minutes for the flight was disqualified. The first prize was one half-hour's free flying.

Next week-end and on that following spot landing and map reading contests will be held with the same terms and awards.

Arrangements have been made with Mr. W. J. Scott to deliver a course of eight lectures on elementary navigation every Thursday at 8 p.m. A fee of 15s. for the course will be charged. At the end of the course an examination will be held and the winning pupil will be awarded a quarter of an hour's dual instruction.

**BENGAL**

The report of December's flying activities is marred by the loss of a very popular member, Major H. R. C. Meade, who lost his life in an accident on the third of the month.

Flying time for December showed an improvement over that for November. The pilot instructor twice visited Khargpur to give the inhabitants joy-rides. Mr. L. Dey and Mr. D. K. Roy have joined the club for the purpose of obtaining their Indian "B" licences. Both have done a considerable amount of flying in England and obtained their English "B" licences. Mr. S. N. Chowdhury, a recently club-trained pilot, has branched out into private ownership. His choice was a British Klemm, and he is now busily piling up the hours. There were two competitions in December, a pin pointing competition for the "Viceroy's" Challenge Plate, presented to the club by Her Excellency the Countess of Willingdon, and a forced landing competition for the "Lady Willingdon" Challenge Cup, presented by Sir U. N. Brahmachari, Kt. Her Excellency the Countess of Willingdon visited the club on December 7, and had tea with the members. An exhibition of flying was arranged in honour of the occasion. Her Excellency then presented the prizes. The "Viceroy's" Challenge Plate was won by Mr. R. Palchoudhuri, and the "Lady Willingdon" Challenge Cup by Mr. H. I. Matthews.

Their Highnesses the Maharaja of Bhutan and the Maharaja of Sikkim visited the club on December 30, and watched aerobatics, formation flying, and crazy flying. On January 1 a flight of three machines, led by F/O. Knocker, Mr. H. I. Matthews No. 2, and F/O. M. G. R. Harris No. 3, flew past the saluting base at the Proclamation Parade on the Maidan. The formation was excellent. The Hon. Sir Frank Noyce, Kt., C.B.I., C.B.E., I.C.S., visited the club on January 2.

The flying return for December shows 34 hr. 40 min. dual and 105 hr. 25 min. solo. Mr. E. P. Swallow took his "A" licence. There are now 295 members, of whom 151 are Indian.

### Private Flying

#### NOTTINGHAM

Flying time last week at the Nottingham Flying Club was 9 hr. 15 min.

On Tuesday Mr. Berkin flew Capt. Shepperd to Farnborough in the new "Major Moth," and made the return trip in very good time. Two new members arrived, and on Friday night a dance was held in the club. Mrs. Patterson has arrived with her Miles "Hawk," which is to be housed indefinitely at Tollerton.

#### NORTHAMPTONSHIRE

The landing competition was run off last Sunday, the results being: 1, W. Tomkins; 2, J. Linnell; 3, R. Morris. Mr. Shuttleworth visited the aerodrome in his "Dragon," and Mrs. Crossley, Capt. Findlay, R. Morris and Mr. Deterding also appeared during the week.

One new flying member, Miss I. C. Schwedler, joined, and a general meeting of the members was held in the clubhouse on Friday, February 8.

## SINCE 1908!

### *The Unique Career of the Chief Instructor of the Southern Aero Club, Mr. C. L. Pashley, Who has Flown 8,050 hours as Instructor and Test Pilot*

IT is not often that the necessity is felt of giving a personal history—and, incidentally, of producing a deep blush on the countenance of the unfortunate person concerned.

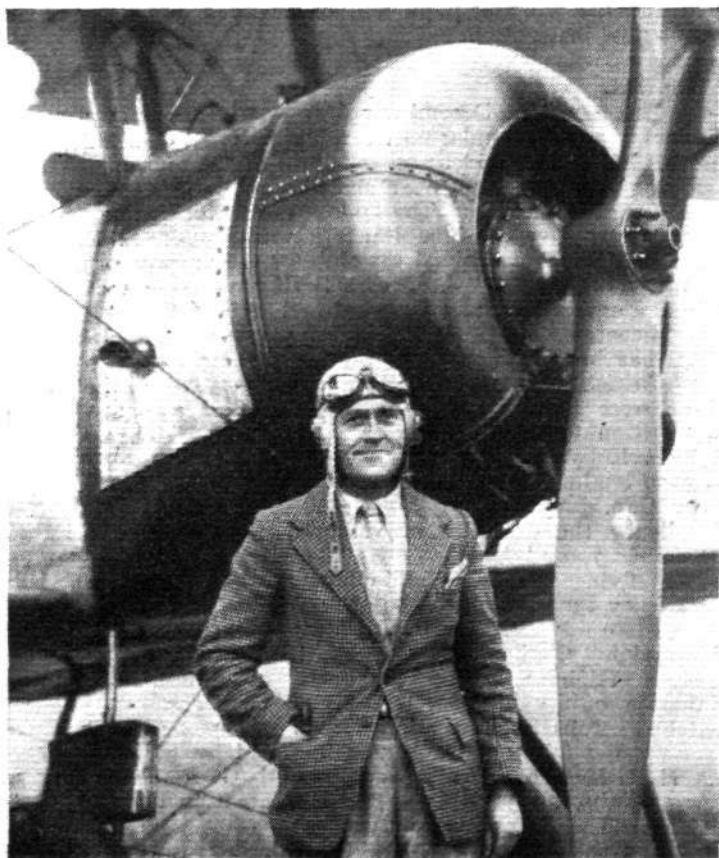
There are a number of well-tried air veterans in the world to-day, but few can have had such a unique career as that of Cecil Pashley. His experience dates back to the days before Shoreham Aerodrome appeared on the landscape—and, as most people know, Shoreham was an aerodrome when most of the present generation of pilots were in their cots.

Mr. C. L. Pashley, after experience on the Lane glider at Hockley in 1908, went to Brooklands, where he taught himself to fly.

There he gained experience on most of the early types, including the famous "cross-Channel" Bleriot monoplane, the Voisin biplane, and the Sommer biplane.

In 1911 he obtained his Royal Aero Club Certificate No. 106, as in those days it was quite usual for a pilot to gain considerable experience before doing the tests for his certificate.

When Shoreham Aerodrome was started, Pashley, together with his brother, opened a flying school there. They also designed and built a small pusher biplane for competition flying, and this machine won its first race a few days after it was completed, the occasion being the pylon race for the Shell Cup at the opening of the 1914 season. The pilots at this meeting included the late John Alcock, G. M. Dyott, and J. L. Hall.



**VETERANS BOTH!** Mr. C. L. Pashley and one of the Southern Aero Club's lately discarded 504 Ks. Many pilots must regret the passing of the "blip" switch and the "fine adjustment."

Work was just being commenced on a faster machine of the same type, fitted with a 100 h.p. Gnome engine, when war broke out, and Shoreham Aerodrome was taken over by the War Office.

During the war Pashley became an approved Admiralty test pilot, while acting also as instructor, and he trained a considerable number of R.N.A.S. and R.F.C. pilots.

#### More Recent History

In 1920 he obtained his Pilot's "B" Licence, when these were first instituted, after which he did some flying for the Central Aircraft Co., of Northolt. He then went into partnership with F. G. Miles, who is now producing "Hawks" at Reading, and together they started both the Southern Aero Club and Southern Aircraft, Ltd., at Shoreham. The latter company is best known for the very successful light aeroplane known as the "Martlet," which was produced in 1929.

The Southern Aero Club, of which Pashley has been chief instructor since its inception, is principally remarkable for the fact that the "Avro 504K" had been used for training pupils right up to last year, and the skill of the pilots turned out has been ample proof of the wisdom in the choice of this type of machine.

This veteran's flying hours now total 8,050. This is all the more remarkable when it is realised that at no time in his career has he ever been employed on an air line. He has flown 65 different types, on 15 of which, including two types of seaplane, he has given instruction.

Some of the best known pilots both of to-day and in the past have received their training at his hands.

#### The Club Year

AN increase in flying hours of more than 27 per cent. on 1933 is indicated by the available subsidised light aeroplane club figures for last year. Returns from twenty-six of the thirty clubs show that membership has increased from 4,800 to 7,116, flying membership from 2,565 to 4,016 and hourage from 26,695 to 33,968.

These clubs own ninety-seven machines and 486 pupils were trained for "A" licences, as against 433 for the previous year. In addition, fifty pilots obtained their "B" licences. The unsubsidised clubs also did well. Returns from eleven show that 8,257 hours were flown.

The highest hourage figures for each machine in use were those put up by the Brooklands Flying Club—678 per machine. The Herts and Essex club comes next with 570 hours and the Catdiff, London, and Bristol and Wessex follow closely.

#### Another Tcheliuskine Affair

Eighty-nine fishermen were rescued by aeroplanes after they had been carried away by an ice-floe while fishing in the north-eastern part of the Caspian Sea. Machines of the Astrakhan Aviation Base came to their assistance, and the men, it is reported, have suffered no ill-effects.

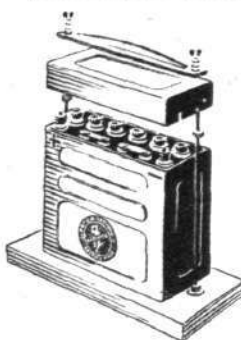
Curiously enough, on January 4 three men were rescued from an ice-flow in Canada by Mr. Main, the chief instructor of the Toronto Flying Club. They had been adrift for twenty-four hours.

#### Lord Sempill

At the time of going to press no news had been received concerning Lord Sempill, who had been missing since he left Onslow, Western Australia, at 10 a.m. on Tuesday morning. A search was about to be organised. Lord Sempill left Perth on his return journey to England, on Sunday.



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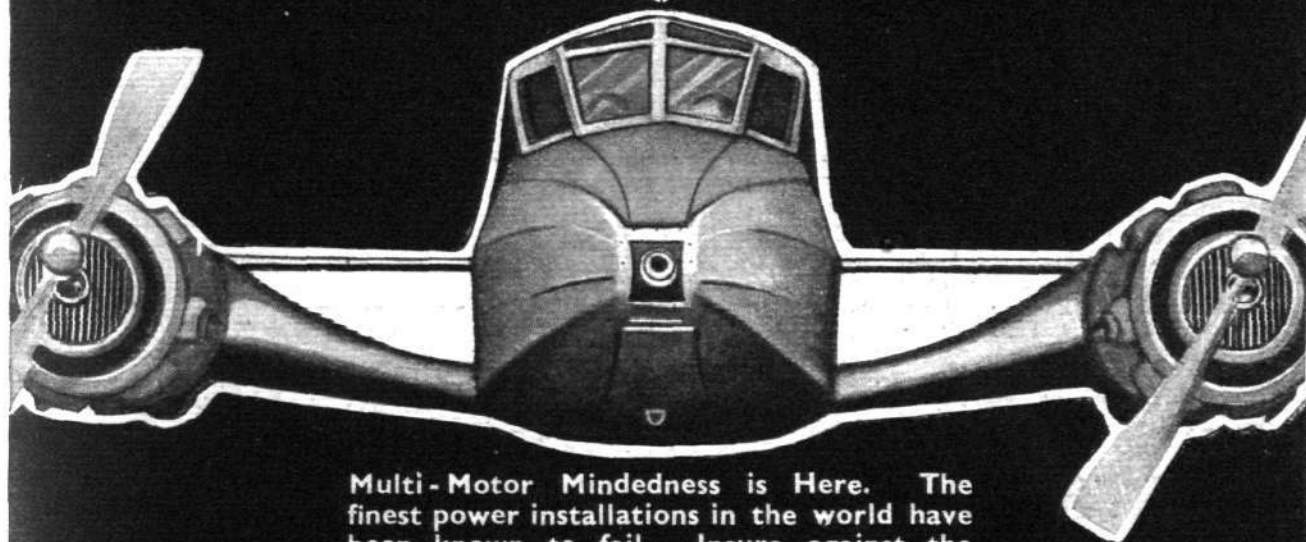
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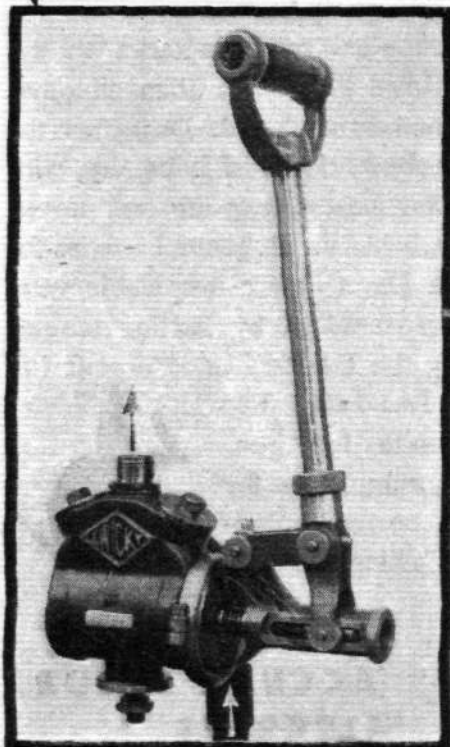
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# Correspondence

The Editor does not hold himself responsible for opinions expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for insertion in these columns.

## THOSE CABLE PYLONS

[3007] Mr. R. Somerset, writing in your issue of January 31, has the right idea, but does not carry it far enough. To my mind, the cables, and not the pylons, constitute the greater menace. If, owing to bad visibility, it is difficult to see the pylons, the cables would be quite invisible. Owing to the construction of the former there is no indication as to the direction in which the latter run; in some cases they approach from one direction and run off at an angle.

Mr. Somerset's idea of a chalk ring would be of little practical value; at best it would need frequent renewal, and if cattle were pastured in the field it would very soon be entirely obliterated. The cement ring would be permanent, but would indicate only the pylon. The idea is capable of improvement.

My own idea is that each pylon should be distinguished by a base of some light-coloured cement such as "Snowcrete," with arrow-head projections on the sides indicating the direction of the cables. Where they run in more than one direction the projections could be arranged accordingly, and added to from time to time as necessary. Under conditions of normally good visibility such a device would be visible from a considerable height, and even under poor conditions in time to allow the pilot to manoeuvre to a safe landing.

Such a device would be somewhat more costly in the first instance, but would need no upkeep. C. W. MARTIN.  
Bristol, 6.

## STRINGS OF BEADS?

[3008] Your correspondent Mr. R. Somerset appears to me to be short-circuiting the chief problem when he suggests that pylons should be distinctly marked. Touch wood, I have not yet had to make a forced landing in murky (or any other) weather, but I cannot help feeling that my chief difficulty would be to see the wires, not the pylons, especially if the former were against a background of hills and not the sky.

The only solution, as I see it, would be to thread corks (or whatever they are) on the wires, as is done on telegraph wires near game preserves. Still, as your correspondent suggests, if people are not equipped so that they can fly high in dirty weather they should not be about at all. W. C. R.  
London, W.1.

## ENGINES: DIRECTION OF ROTATION

[3009] I plead for future aero engines to be so designed that they can be arranged to run in either direction. There is no twin- or four-engined machine in the world, apart from one or two tandem-engined ones, which would not be improved if right- and left-hand engines were available. Engine torque reactions would cancel out, tail loads, flutter and vibration would be reduced, and control and directional stability would be simplified and improved. The aeroplane would, in fact, be entirely symmetrical on both sides of its longitudinal central line. We should no longer have those twin-engined aeroplanes which will fly reasonably well with one particular engine stopped, but fly badly or not at all with the other engine out of action.

It would admittedly be difficult or impossible to arrange for many engines in present use to rotate in the opposite direction from the standard, but if this problem were considered from the early design stages I believe that engines could be readily convertible to run either way. The only complication from an operator's point of view would be that spare left- and right-hand airscrews would be necessary, but this is surely a small price to pay for so many advantages.

London, W.1.

W. S. SHACKLETON.

## TACT!

[3010] In connection with your discussion on "Harnessing the Passenger" in last week's *Flight*, it may be of interest to describe the method used in America. Invariably, before taking off and also before landing, also during bumpy weather, the passengers are warned by a notice appearing in illuminated letters at the front of the cabin, "Please Fasten Seat Belts," and the stewardess comes round to see that they are fastened or to help you fasten them. The latter is so much of a routine that it is taken for granted and no apprehension is felt.

Incidentally, the greatest consideration is shown. Beside each passenger is a carton with a neat lid, labelled "Refuse." I do not think that our Railway Air Services show quite such exquisite tact as this in the labelling of their cartons.

Liverpool, 18.

J. C. WALLER.

[The belt warning is not exclusive to America. In Deutsche Luft Hansa machines an illuminated notice appears just before the motors are throttled back for the approach.—ED.]

## NUTS TO CRACK—No. 3

In this week's problem, Flt. Lt. Nicholas Comper, A.F.R.Ae.S., relates the story of a disconcerting occurrence experienced by a competitor at a race meeting at which he was present. The explanation will be published in an early issue, and in the meantime readers may care to send in their own solutions.

A READER of *Flight* who desires to remain anonymous has reminded me of a racing incident the truth of which I can vouch for, as I was present at the same flying meeting. (Incidentally, the Editor and I am grateful to those who have sent in *bona fide* experiences of technical interest. All such communications should be addressed to the Editor.)

"In 1927 (says this reader) we ran an amateur flying club, and our star turn was a biplane with which we occasionally won the odd £50 or so at flying meetings—very welcome additions to our rather limited club funds. We had an important race meeting somewhere south, and we decided to refabric and redope our aeroplane just for appearance sake, if for nothing else.

"I was the lucky one detailed to fly it, and in due course I sat on the starting line waiting for Mr. Reynolds' red flag to drop.

"Off we went, heading for the first turning point. I knew the course by heart, and with that *joie de vivre* which we all feel when we hit the turning point plumb and proper for a tight turn, I put on bank with the requisite rudder. Over we went on a turn which I won't claim was vertical, but which was nearly so. I pulled off bank, or, rather, I should say I pulled on the stick to take off bank; but the stick became like lead in my

hands and I found myself slipping into the ground. With two hands I forced the stick back to central and, side-slipping violently, just managed to miss some trees.

"By the time I had the aeroplane flat again I was right off the course and scared stiff. Flying level, however, seemed to work, and, after correcting my deviation from the straight and narrow path I faced the next turn. This time I deliberately took a wide sweep, as my recent experience had convinced me something was wrong. Getting in the turn was easy, but getting out of it was—well, Scott's famous remark just about describes it.

"The race went on, but I was left far behind, for, in the interests of my own safety, quite apart from that of the aeroplane, I had to skid round instead of cornering in the racing manner.

"After I had landed we examined things. We found three or four out of the twenty-four wing ribs broken and a few inches of slack in the aileron cables. The aeroplane had been flown for over a year; it had been completely stripped and overhauled before re-covering and doping, and the aileron control system had a very high factor of safety."

What broke the ribs, and why would the aeroplane not come out of a turn?

# COMMERCIAL AVIATION

## — AIRLINES — AIRPORTS —



**THE LARGEST SAVOIA:** The Savoia-Marchetti S.74 carries twenty-seven passengers at a cruising speed of 174 m.p.h. This cantilever monoplane, which is distinctly reminiscent of the Fokker F.36, was described in *Flight* on January 3. It may be used on part of the Sabena-Ala Littoria service between London and Rome and it is proposed that the passengers should be fed with oxygen while crossing the Alps.

### CROYDON

#### *Air France Breaks the Ice : An Inveterate "Imperialist" : Diplomacy in a Hurry : A Very Dry Martini*

ON one or two days last week the weather was such that ice formation was experienced on the Croydon routes. An Air France freighter landed near Dorking on this account, mainly as a precautionary measure, I understand. Incidentally, a pilot of Spartan Air Lines on the Isle of Wight route passed over the spot shortly after the freighter's landing, and experienced a downward bump that brought him from 1,000 ft. to 400 ft.

Air route pilots in general did not fly high during those days, thus avoiding the trouble with ice.

Air France, as it happens, is the first European company to fit de-icers as standard to all air liners, and the first Wibault so fitted was at Croydon last week. The de-icer selected is the American Goodrich, which is a system of inflatable rubber leading edges to wings and elevators. M. Boudrie tells me that the gadget is highly efficient, having been tried out with really heavy ice deposit which, until the de-icers (or defrosters, as Air France calls them—a less clumsy word) were brought into action, affected the flying of the machine. When the system was switched on the thick ice crust was dispersed immediately. It is quite time all companies fitted these defrosters to their passenger-carrying machines, especially those with metal wings.

Miss Ruth Stuart Rodger is an Imperial Airways "fan." She has flown 5,000 miles on that company's aeroplanes, and started on another long trip last week, to Entebbe and M'beya (Africa), where she is to make a 5,000 ft. film of African natives and their customs, and of wild life. She won the Institute of Amateur Cinematographer's gold medal last year with a film taken during one of her trips by Imperial Airways. It is understood that her mother presents her with these flights as birthday gifts.

When I met Capt. Robertson, of Dunlop's, at about midday last week at Croydon, he had already visited Birmingham and Cambridge by air on business that morning. I wonder if other firms realise what they miss by not having a flying representative.

Among last week's passengers were M. Flandin, Sir John Simon, Babe Ruth (who is almost old enough to be called "Mr."), and a passenger from London to Soerabaia. There

was also a mystery diplomat who said he had to get to a Continental city at all costs on important international affairs. The aeroplane was fully booked but, luckily, a passenger cancelled. I am told the man of affairs was a real diplomat—with a horn-rimmed monocle. Anyway, Europe was saved.

The second Boulton Paul feeder-line machine was delivered to Imperial Airways during the week. It is named *Britomart* after the virgin who is famed in history for, among other exploits, jumping into the sea to avoid King Minos. The machine is aptly registered G-ACQY, and could doubtless be fitted with floats if pursued by a monarch.

Capt. G. P. Olley has taken delivery of a specially equipped D.H. 89. Luxurious "club-type" armchairs are fitted, and there is an ingenious system whereby the outer arms of the chairs let down into the gangway and can be raised if anyone wishes to pass. This gives extra large and comfortable seating accommodation. It was rumoured that there were small cocktail cabinets, one for each passenger. A friend of mine went up with Capt. Olley and afterwards said it was true, but there was "nothing in it." This seemed contradictory, until it transpired that my friend's particular cocktail outfit was empty.

This machine is said to be very free from noise, and to ride bumps with remarkable ease; it touched 174 m.p.h. during a test flight last Saturday. The machine was decorated to Capt. Olley's own specification, and the prevailing tone is a subdued silver grey.

A. VIATOR.

#### **The Future of A.B. Aerotransport**

Important recommendations have been made by the Royal Commission which has been considering civil aviation in Sweden. It is suggested that the State should contribute 2,500,000 kroner (£137,000 at par) to the present A.B. Aerotransport, thus becoming virtually the sole owner. At present the company receives subsidies in the form of a mail contract and loans, while the night mail service has been financed by the Post Office on a basis of costs. So far A.B.A. has operated no regular services in Sweden itself, and the Government's present agreement terminates at the end of 1936.



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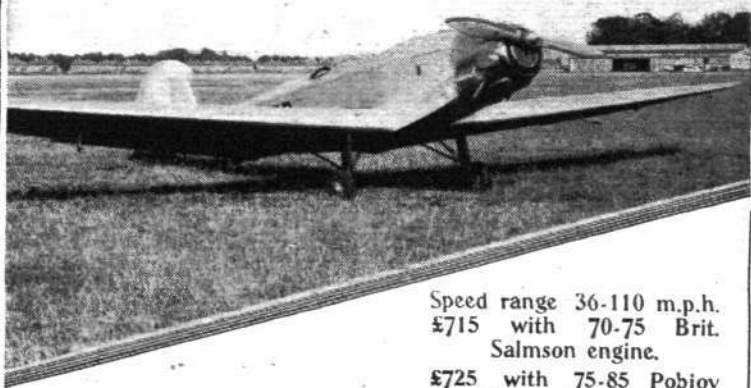
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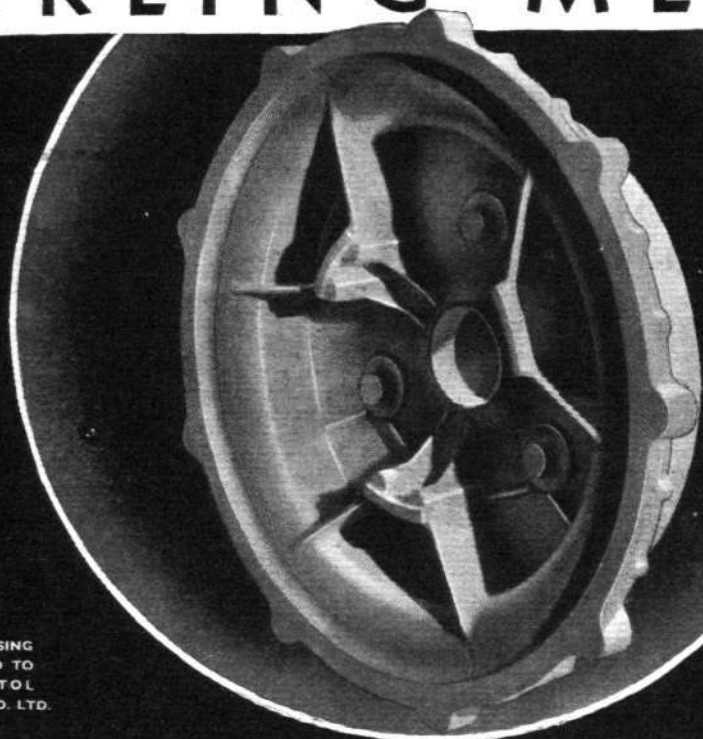
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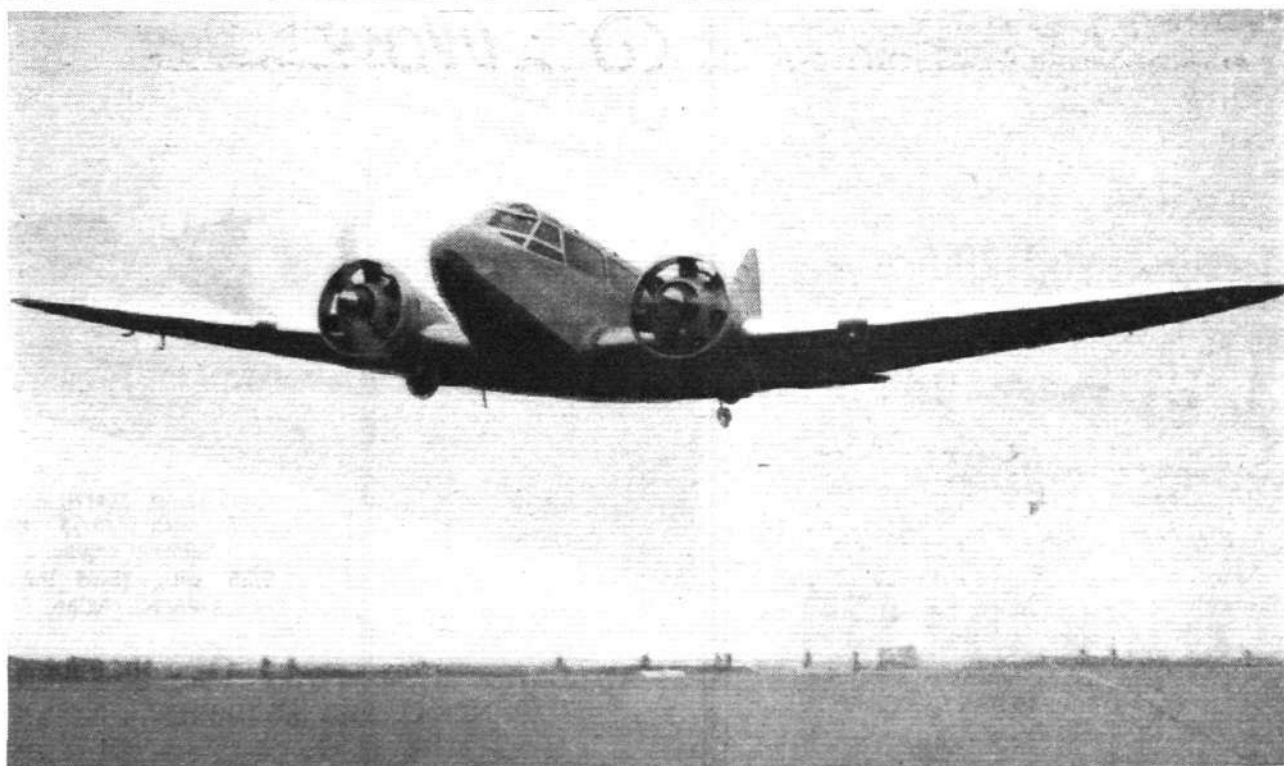
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## JERSEY EXPRESS

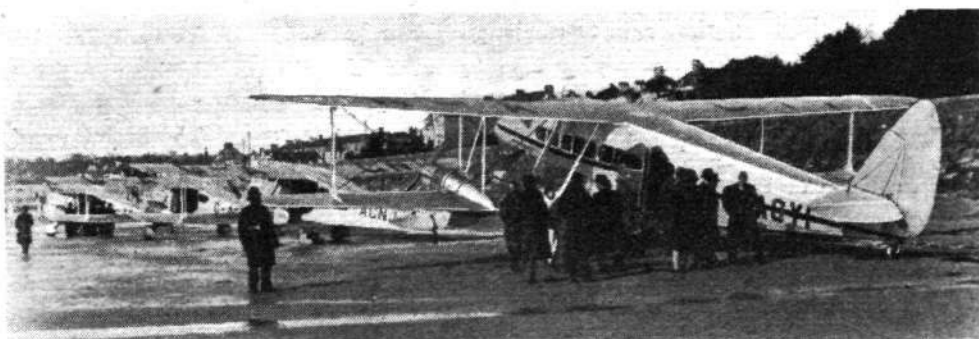
*Jersey Airways' First D.H.  
86 "Express" Flies to St.  
Helier: Comprehensive  
Navigation Equipment*

**A**VERAGING 156 m.p.h. with a fair following wind, Jersey Airways' first D.H.86 "Express," *Giffard Bay*, flew its maiden trip from Heston to St. Helier last Thursday. The outward distance was covered in 1 hr. 11 min., and the return in 1 hr. 35 min., showing an overall speed of 137 m.p.h.—a figure which may be taken as a basis for this summer's flying schedule, when the six ordered "Expresses" will be in service.

Apart from the modified Qantas-type nose, to accommodate full dual control, and the Dowty hydraulically operated split trailing-edge flaps, the Jersey "Expresses" are very completely equipped. Delivery No. 1, which was flown by Mr. B. A. Blythe—with the moral support of Capt. Broad—has a Kollsman sensitive altimeter, a Smith rate-of-climb indicator, a Sperry artificial horizon and directional gyro, and a Smith turn and bank indicator.

The sensitive altimeter is an interesting and, incidentally, expensive instrument, indicating altitude changes to a minimum of twenty feet. Two hands move over a scale of one to ten, the "hour hand" giving the thousands and the "minute hand" giving the hundreds of feet. Adjustments to suit the changing barometric pressures can be made very simply and quickly.

The rate-of-climb indicator, apart from its value in sheer "avigation," enables the pilot to judge his descent from higher altitudes in relation to his passengers' ear-drums. All normal blind flying is carried out on the Sperry, and the turn indi-



*Giffard Bay*, on the beach at St. Helier, with three of the service "Dragons" in the background. This picture was taken immediately after landing and before the inevitably large crowd collected. (Flight photograph.)

cator is fitted as a check and to comply with C. of A. regulations; the artificial horizon, of course, does not function in aerobatic attitudes.

In addition, *Giffard Bay* has Standard two-way radio. Somewhere towards Alderney on the outward journey the station on Jersey received a message from Barton, Manchester, to the effect that the 86 was calling Jersey! This year, it is hoped, Jersey will have its own complete D/F station, but in the meantime the machines obtain bearings from Portsmouth when necessary, and the pilots can usually obtain a "fix" through that station and Croydon. This year, too, will see a D/F station at Heston, and the chain will then be complete.

Although the beach at St. Helier is nothing if not extensive, it is often necessary to land and take off slightly across wind. A "Dragon" can be handled satisfactorily under these circumstances, and on Thursday it was shown that even the much larger and heavier "Express" responds gamely to "aileron against rudder" tactics. Nevertheless, the pilots will undoubtedly breathe sighs of relief when the long-awaited aerodrome is laid out; for the time being they bear most of the responsibility and are to be congratulated on a fine record. The aerodrome on Alderney, which will be used as a base, should be ready during the summer, and one "Dragon" is now more or less permanently housed in a shed on the St. Helier racecourse. Flt. Lt. C. E. Eckersley-Maslin, the chief pilot, uses this machine on the Rennes service.

The people of St. Helier are usually very interested in the arrivals and departures of the machine, and on Thursday there was an exceptionally big crowd to greet the largest machine yet seen in the Island. Among the passengers on the maiden trip were Kathleen Countess of Drogheda, Mr. C. P. Saraci, Chamberlain to King Zog of Albania, both Mr. W. L. Thurgood and Mr. L. T. H. Greig, directors of Jersey Airways, Ltd., and Mr. A. C. M. Jackaman, of Airports, Ltd. After lunch, at which Mr. H. Giffard (H.M. Receiver-General) and Mr. J. A. Perrée (Chairman of Channel Island Airways, Ltd., the holding company) spoke, various notabilities and others were taken for a short flight. The "Express" landed at Heston again just as dark was falling.

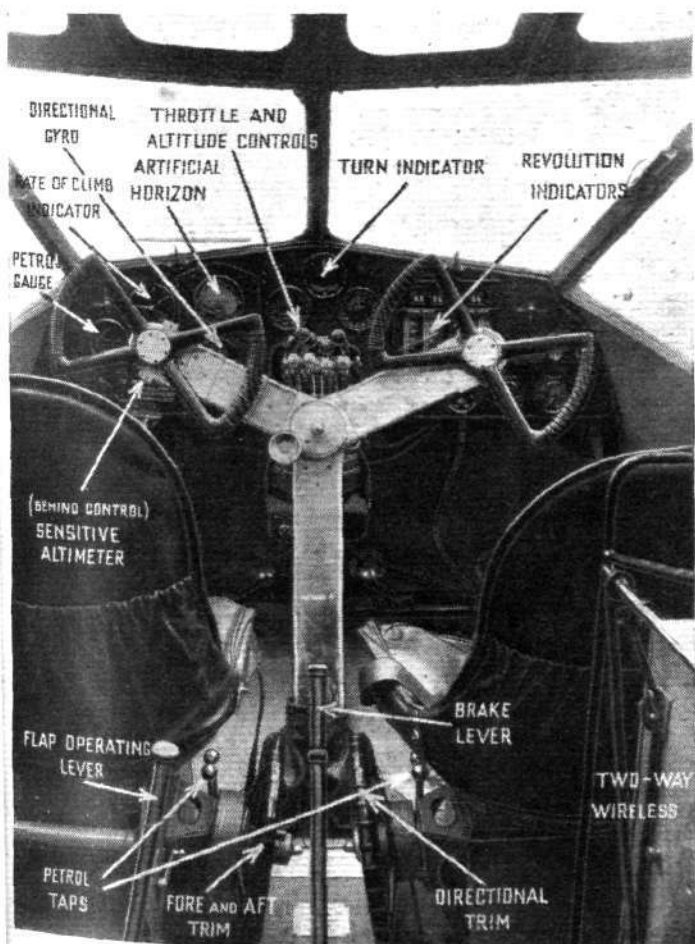
## Municipal Airports

At a meeting last Friday of the Airport Operators' Division of the Air Transport Section of the Society of British Aircraft Constructors, it was decided to form a special section to serve the interests of municipal authorities concerned with airport and aerodrome development.

## Across the South Atlantic

Last week Deutsche Luft Hansa completed a year's successful operation of their South American mail service. In all fifty-six crossings have been made, using first the *Westfalen* and later both this vessel and the *Schwabenland* as catapult and supply ships for the Dornier "Wals."

Henceforth, Air France proposes to run "all-air" services to South America on alternate weeks, using the Blériot *Santos Dumont* flying boat until inspection and overhaul becomes due and the Couzinet *Arc en Ciel* as a relief machine. Other services will be run according to the present plan, which involves the use of a fast boat between the Canaries and the island of Noronha, which points are reached by air.



The controls and special instruments of *Giffard Bay*. Later machines for Jersey Airways will be fitted with swing-over controls.

## Commercial Aviation

### Combating Ice Formation

Apart from the standard Goodrich De-Icer equipment which has been installed on a number of United Air Lines' Boeing 247-D. fleet, these machines have their airscrews partially sheathed in oiled rubber.

### Service After Sales

It has always been the policy of the De Havilland Aircraft Company to provide an adequate service after sales. The latest evidence of this is a trip to Australia which is being made by Major Hereward de Havilland for the purpose of clearing up certain queries which have been raised with regard to the operation of D.H.86's in that country.

### An Airship Agreement

An agreement has been reached between Germany and Spain whereby German airships are permitted to fly between Friedrichshafen and South America, with landings at Barcelona and Seville, on conditions that Spanish airships should have the same rights. It is also stipulated that the service may ultimately be operated by a German-Spanish company. Spain will have the right to take a half share in the South American service already being operated and in any other services eventually opened.

### D.L.H.'s Latest Move

A Junkers Ju. 52, piloted by Otto Kisserberth and owned by Deutsche Luft Hansa, is to be flown to Cairo from Berlin on a survey flight. The machine is due to start to-morrow, will stop for the night at Athens, and will remain in Cairo for four or five days. Something like 8,000 litres of Shell fuel has been supplied for the trip. One can only wonder whether this is part of the plan to link Germany with China, where D.L.H. hold a strong interest in the Eurasia Aviation Corporation, via India. The original plan to cross Mongolia and Russia has been held up by internal troubles.

It is reported, too, that D.L.H. are to establish a direct service between Berlin and Stockholm this year. Last Thursday the company inaugurated a twice-daily service between Dusseldorf and the capital.

### London's Airports

Last week the City Lands Committee of the L.C.C. asked for authority to spend £750 on professional advice concerning airports, and last Tuesday Alderman Bolsom demanded, at a meeting of the Council, a string of airports around London, the idea being that these might be valuable for both commercial and defensive reasons. The central airport scheme is still being considered.

Meanwhile there is, perhaps, value in a new North London airport somewhere between Hendon and Hatfield and within easy reach of a tube station. In the south, Gatwick, with the adjoining Southern Railway station which is to be built very shortly, may eventually rival Croydon in importance. Airports, Ltd., are well ahead with their plans, and the railway company is now backing them up firmly. Before midsummer we should see London and Continental Air Lines running a high-speed service to Le Bourget from this aerodrome.

### Progress in China

Passenger service on the Shanghai-Canton air route was resumed early this year, using Douglas "Dolphins" without amphibian gear, with a bi-weekly service in each direction. The distance of 1,000 miles is made in eight and a-half hours, including four coastal stops. The China National Aviation Corporation, which is operating, under Pan-American and Chinese auspices, some 3,000 miles of air routes, plans the addition, early in the present year, of a service from Chungking in Szechuen Province to Kweiyang in Yunnan Province, a distance of between 400 and 500 miles. It is also planning for possible consummation in 1936 of an air route from Chengtu, Szechuen, to Lhasa in Tibet, an extension of about 900 miles.

The Eurasia Aviation Corporation, in which D.L.H. has an interest, has decided to extend the Lanchow (Kansu)-Ninghsia airway to Paotow, the western terminus of the Peiping-Suiyuan railway. Work on the construction of an aerodrome at Paotow has been started and will shortly be completed. The new aerodrome at Chengchow, for the Eurasia Corporation's Shanghai-Sinkiang service, is opened, and a service between Peiping and Canton has been started.

The C.N.A.C. has obtained the permission of the Chinese Government to extend the Shanghai-Canton line to Manila and establish a Sino-Philippine air service.

### Two New Airports for Palestine

The Palestine Government is to lay out two new aerodromes on modern lines. The first, which is on a strategic position on the Empire route, is to be at Lydda, and the second at Haifa.

### Ringway Again

The Secretary of State for Air has confirmed an order giving the Manchester City Corporation power to purchase ground in the Ringway district. However, the battle still rages in the background, and many flying Mancunians insist that Barton can still be extended and improved at a cost which will be small compared with that involved in laying out an entirely new airport. Ringway will hardly be ready before the summer of 1936.

### Developments at Speke

At an estimated cost of £100,000, buildings 350 feet in length and four storeys high are to be put up at Speke Airport, Liverpool, for air control, the accommodation of passengers, pilots and staff, and for Customs, Post Office, and C.I.D. officials. There will be lifts, and a flat roof will give access to the control tower, centrally placed in the building. There will naturally be radio equipment, and flanking this fine building will be two large hangars. Other buildings will provide restaurant accommodation, and in addition there will be car parks and ornamental gardens. It is expected that by midsummer the central control tower and one of the hangars will be built and the lighting equipment will have been installed.

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### PUBLICATIONS RECEIVED

- National Advisory Committee for Aeronautics. Report No. 483. *Effect of Moderate Air Flow on the Distribution of Fuel Sprays after Injection Cut-off.* By A. M. Rothrock and R. C. Spencer. Price 10 cents.
- No. 485. *The Drag of Airplane Wheels, Wheel Fairings and Landing Gears.*—I. By W. H. Herrstein, Jr., and D. Bierman. Price 10 cents.
- No. 487. *An Aerodynamic Analysis of the Autogiro Rotor with a Comparison Between Calculated and Experimental Results.* By J. B. Wheatley. Price 5 cents.
- No. 488. *Heat Transfer from Finned Metal Cylinders in an Air Stream.* By A. E. Biermann and B. Pinkel. Price 10 cents.
- No. 489. *Air Conditions Close to the Ground and the Effect on Airplane Landings.* By F. L. Thompson, W. C. Peck and A. P. Beard. Price 10 cents.
- No. 490. *The Weathering of Aluminum Alloy Sheet Materials Used in Aircraft.* By W. Mutchler. Price 15 cents.
- No. 491. *Vibration Response of Airplane Structures.* By T. Theodoresen and A. G. Galalles. Price 10 cents.
- No. 492. *Tests of 16 Related Airfoils at High Speeds.* By J. Stack and A. E. von Doenhoff. Price 10 cents.
- No. 493. *The Physical Effects of Detonation in a Closed Cylindrical Chamber.* By C. S. Draper. Price 10 cents.
- No. 497. *Computation of the Two-Dimensional Flow in a Laminar Boundary Layer.* By H. L. Dryden. Price 5 cents.
- No. 499. *Wind-Tunnel Research Comparing Lateral Control Devices, Particularly at High Angles of Attack. XII—Upper-Surface Ailerons on Wings with Split Flaps.* By F. E. Weick and C. J. Wenzinger. Price 10 cents.
- No. 500. *The Influence of Tip Shape on the Wing Load Distribution as Determined by Flight Tests.* By R. C. Rhode. Price 10 cents.
- No. 501. *Relative Loading on Biplane Wings of Unequal Chords.* By W. S. Diehl. Price 5 cents.
- No. 502. *Scale Effect on Clark Y Airfoil Characteristics from N.A.C.A. Full-Scale Wind-Tunnel Tests.* By A. Silverstein. Price 10 cents.
- America: Superintendent of Documents, Washington, D.C.

### AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m = motors. (The numbers in parentheses are those under which the Specification will be printed and abridged, etc.)

#### APPLIED FOR IN 1933.

Published, February 14th, 1935.

34695. MEREDITH, F. W., AND COOKE, P. A. Control apparatus for aeroplanes and other dirigible objects. (422,813)

#### APPLIED FOR IN 1934.

12662. GLAUSER, O., AND HUG, F. A., AND HUG, V. A. (trading as HUG, GER.) Aircraft- and artillery-observation instrument. (422,758)

15703. FERGUS, W. W. Anti-aircraft gun mountings. (422,882)

24091. NISHI, H. Arrangements for starting flight requiring no gliding. (422,621)



# FLIGHT

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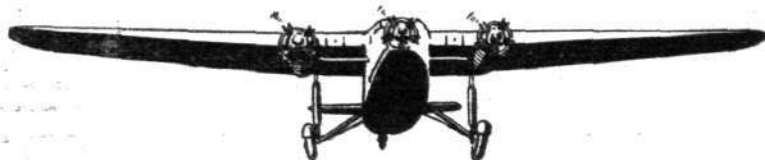
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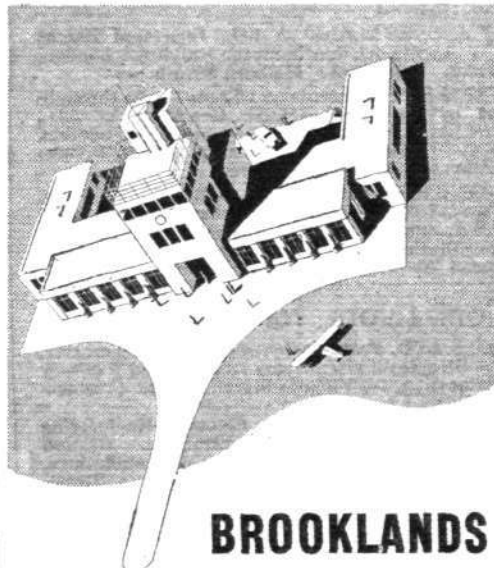
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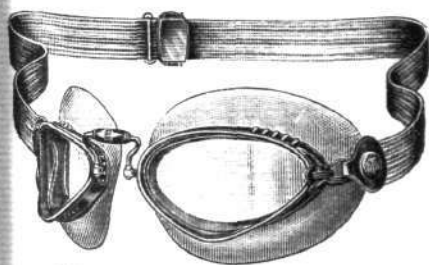
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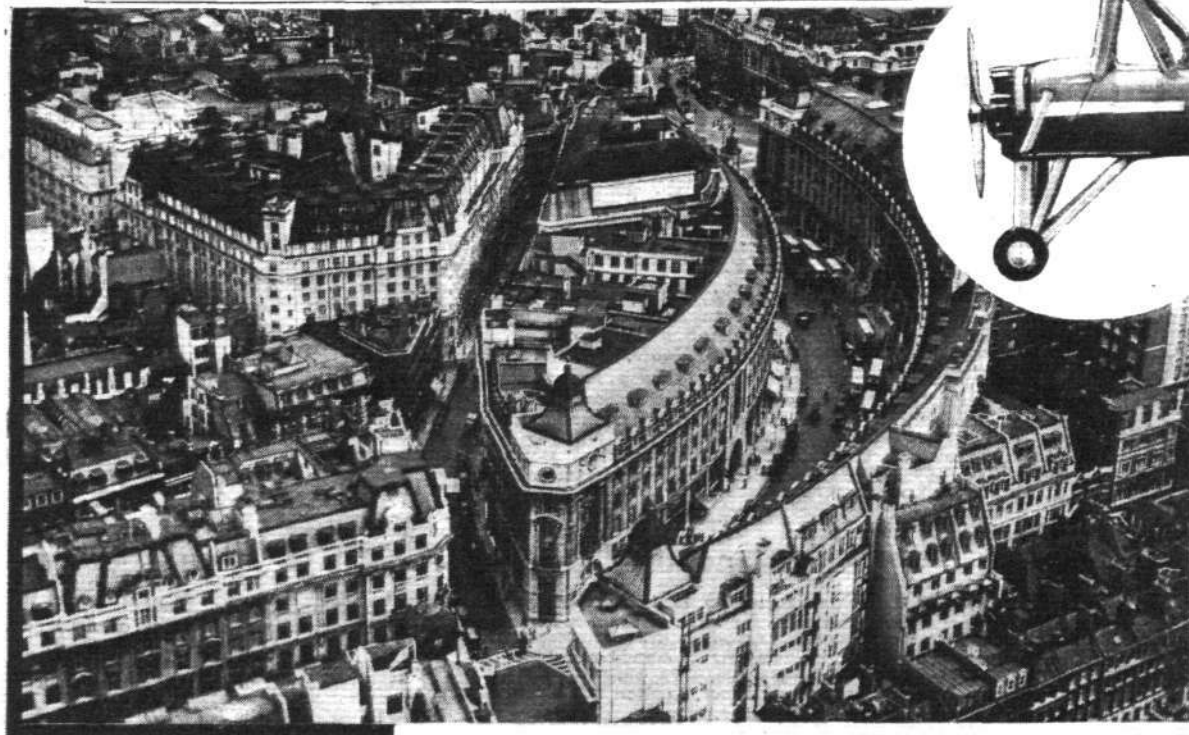
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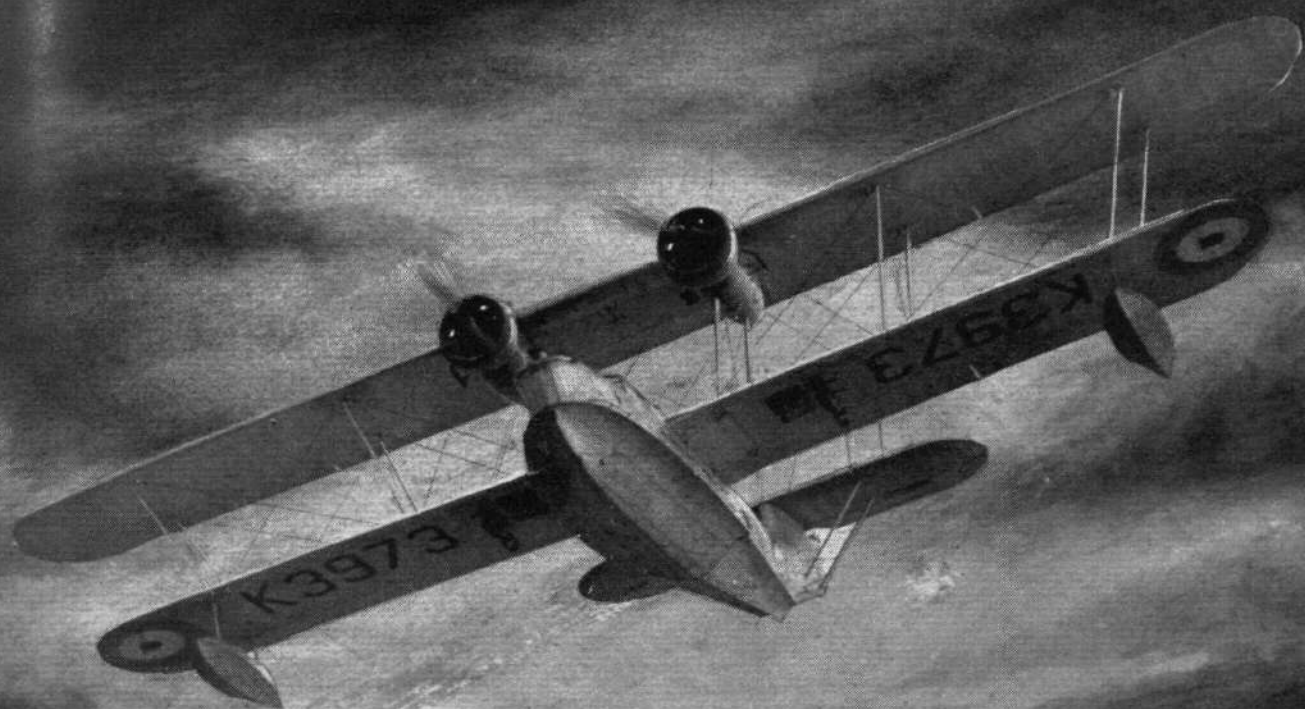
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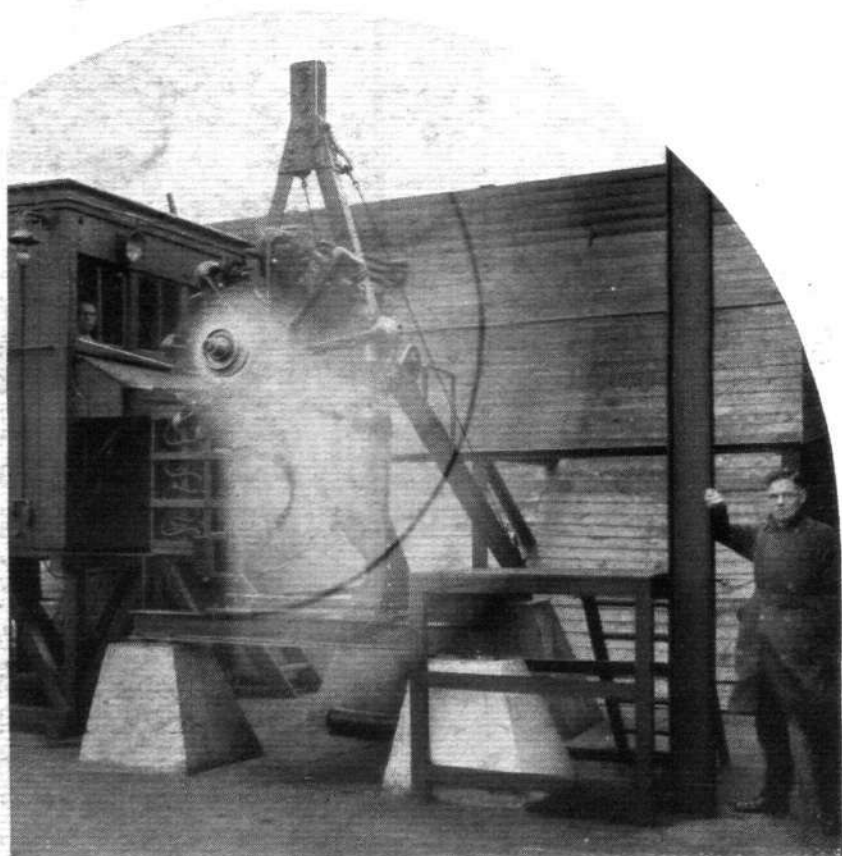
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